Product Service Manual – X193HQ

Service Manual for acer: X193HQ

P/N: 9J.0NA11.xxx
9J.0NA12.xxx

Applicable for All Regions

Version: 001
Date:2008/07/15

Notice:
- For RO to input specific "Legal Requirement" in specific NS regarding to responsibility and liability statements.

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Abbreviations & Acronyms

1. About This Manual

This manual contains information about maintenance and service of acer products. Use this manual to perform diagnostics tests, troubleshoot problems, and align the acer product.

1.1. Trademark

The following terms are trademarks of Acer Inc. :

Acer

Importance

Only trained service personnel who are familiar with this Acer Product shall perform service or maintenance to it. Before performing any maintenance or service, the engineer MUST read the "Safety Note".

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2. Introduction

This section contains general service information, please read through carefully. It should be stored for easy access place for quick reference.

2.1. RoHS (2002/95/EC) Requirements

– Applied to all countries require RoHS.

The RoHS (Restriction of Hazardous Substance in Electrical and Electronic Equipment Directive) is a legal requirement by EU (European Union) for the global electronics industry which sold in EU and some counties also require this requirement. Any electrical and electronics products launched in the market after June 2006 should meet this RoHS requirements. Products launched in the market before June 2006 are not required to compliant with RoHS parts. If the original parts are not RoHS complaints, the replacement parts can be non ROHS complaints, but if the original parts are RoHS compliant, the replacement parts MUST be RoHS complaints.
If the product service or maintenance require replacing any parts, please confirming the RoHS requirement before replace them.

2.2. Safety Notice

1. Make sure your working environment is dry and clean, and meets all government safety requirements.
2. Ensure that other persons are safe while you are servicing the product.
   DO NOT perform any action that may cause a hazard to the customer or make the product unsafe.
3. Use proper safety devices to ensure your personal safety.
4. Always use approved tools and test equipment for servicing.
5. Never assume the product's power is disconnected from the mains power supply. Check that it is disconnected before opening the product's cabinet.
6. Modules containing electrical components are sensitive to electrostatic discharge (ESD). Follow ESD safety procedures while handling these parts.
7. Some products contain more than one battery. Do not disassemble any battery, or expose it to high temperatures such as throwing into fire, or it may explode.
8. Refer to government requirements for battery recycling or disposal.

2.3 .Compliance Statement

Caution: This Optical Storage Product contains a Laser device. Refer to the product specifications and your local Laser Safety Compliance Requirements.

2.4. General Descriptions

This Service Manual contains general information. There are 3 levels of service:
Level 1: Cosmetic / Appearance / Alignment Service
Level 2: Circuit Board or Standard Parts Replacement
Level 3: Component Repair to Circuit Boards

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3. Product Overview

3.1. Introduction

X193HQ is defined as 18.5"W LCD Monitor supports 1366x768@60Hz resolution with DPMS (Display Power Management System) and acer eColor function. There are dual input types, D-sub, DVI. X193HQ adopts AUO panel, M185XW01 V0 and scalar, RTD2525LH.

The features summary is shown as below,

*** All panel spec. in Q201 definition depends on the variance of panel source.**
*** All spec. of monitor need to warm up at least 1hr.**
*** To test the "Contrast Ratio" and "Luminance" functions, the color status must be "User preset" mode.**
*** 1. "Contrast Ratio": Set "brightness" at 100, and "contrast" at 50.**
*** 2. "Luminance": Set "brightness" at 100, and "contrast" at 100.**

Feature items	Specifications	Remark
Panel supplier & module name	AUO M185XW01 V0	TN, Normally white
Screen diagonal	470.1 mm(18.51")	409.8 mm(H) x230.4 mm(V)
Display Format	1366(H) x 768 (V)	Panel Display information
Pixel Pitch	0.3(H) x 0.3(V) (TYP.)	per one triad
Viewing Angle (@ Contrast Ratio >= 10)	R/L:85/85 degrees (typ) and U/D: 80/80 degrees (typ)	
Analog interface with Scaling supported	Yes	With 15-pin D-sub connector
DVI interface with Scaling supported	Yes	For 1A1D model
Max resolution mode supported	1366 (H) x 768 (V)@60Hz	
Number of Display Colors supported	16.7 Millions	RGB 6-bit +HiFRC
Contrast Ratio	1000:1 (typ.), 600 (min)	Test Condition: Set Contrast at 50, Brightness at 100, Color at User preset
Luminance	300 cd/m^2 (typ.), 240 cd/m^2 (min)	Test Condition: Set contrast at 100, brightness at 100 , color at User preset.
AC power input	Yes	90-264 Volts, 47-63 Hz.
DC power input (with AC power adapter)	No	
DPMS supported	Yes	≤1W
LED indicator for power status showed	Yes	Blue/Amber/None
OSD for control & information supported	Yes	
Multi-language supported for OSD	Yes	EMEA Non-EMEA
Buttons control supported	Yes	6 buttons including 1 monitor power on/off control button.
Flywheel control supported	No	
Scaling function supported	Yes	

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Auto adjustment function supported	Yes	"Auto-Key" function
DDC function supported (EDID ver. 1.3)	Yes	DDC2B
DDC-CI support version 1.1 or later	Yes	DDC-CI
Audio speakers supported	No	
Audio Jack (input connector) supported	No	
Earphone Jack (input connector) supported	No	
Microphone function supported	No	
Mechanical Tilt base design	Yes	From -5 to +23 degree
VESA wall mounting design	Yes	
Mechanical Rotate design	No	
Mechanical Lift base design	No	
Kensington compatible lock design	Yes	

3.2. Operational Specification

3.2.1 Power supply

Item	Condition	Spec	OK	N.A	Remark
Input Voltage range	Universal input full range	90~264VAC /47~63Hz	√		
Input Current range	90 ~ 264VAC	≤ 2.0 Arms	√		
Power Consumption	Normal "On" operation	≤30 W	√		LED: Blue
DPMS	DPMS "Sleep" state	≤ 2 W	√		LED: Amber
DPMS	DPMS "Off" state	≤ 1 W	√		LED: OFF
Inrush Current	110 VAC 220 VAC	< 30 A (peak) < 60 A (peak)	√		Cold-start
Earth Leakage Current	264 VAC/50Hz	< 3.5 mA	√		
Hi-Pot	1. 1500VAC, 1 sec 2. Ground test: 30A, 1sec	Without damage < 0.1 ohm	√		(on-line test) (in-lab test)
Power Line Transient	IEC1000-4-4	1KV	√		
	IEC1000-4-5 (Surge)	Common: 2KV, Differential: 1KV	√		
CCFL operation range	90 ~ 264VAC	3~8mA	√		Depends on panel source
CCFL Frequency	90 ~ 264VAC	40KHz ~ 80KHz	√		Depends on panel source
Power cord		Color: Black Length: 1800 +/- 50 mm	√		

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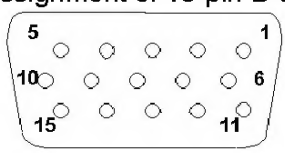
3.2.2 Signal interface

Item	Condition	Spec	OK	N.A	Remark
Signal Cable	15-pin D-Sub	Color: Black Length: 1800 +/- 30 mm	√		
	24-pin DVI-D	Color: Black Length: 1800 +/- 50 mm	√		
Pin assignment	15-pin D-sub connector	See Note-1	√		For 15-pin D-sub
	24-pin DVI-D connector	See Note-2	√		For 24-pin DVI-D
	19-pin HDMI connector	See Note-3		√	For 19-pin HDMI
Analog input	Signal type	Separate analog R/G/B	√		For 15-pin D-sub
	Level	700 mV (peak to peak)	√		
	Impedance	75 Ohms +/- 1.5 Ohms	√		
Sync input	Signal type	Separate H/V-sync (Positive/Negative)	√		For 15-pin D-sub
	Level	Logic High: 2.4V ~ 5.5V Logic Low: 0V ~ 0.5V (TTL level)	√		Refer to VESA VSIS Standard V1R1
	Impedance	Minimum 2.2KΩ(pull down)	√		10KΩ for application
	Sync Pulse Width (SPW)	0.7μs < H-SPW 1H < V-SPW	√		
Digital input	Level	600mV for each differential line	√		
	Impedance	50 Ohm TDR Scan needed for DVI cable and interface board	√		

Note-1: The pin assignment of 15-pin D-sub connector is as below,



Pin	Signal Assignment	Pin	Signal Assignment
1	Red video	9	PC5V (+5 volt power)
2	Green video	10	Sync Ground
3	Blue video	11	Ground
4	Ground	12	SDA
5	Cable Detected	13	H-Sync (or H+V)
6	Red Ground	14	V-sync
7	Green Ground	15	SCL
8	Blue Ground		

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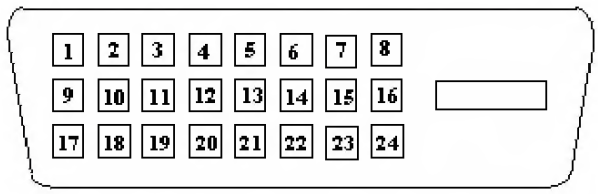
Note-2: The pin assignment of 24-pin DVI-D connector is as below,



Pin	Signal Assignment	Pin	Signal Assignment
1	TMDS RX2-	13	Floating
2	TMDS RX2+	14	+5V Power
3	TMDS Ground	15	Ground
4	Floating	16	Hot Plug Detect
5	Floating	17	TMDS RX0-
6	DDC Clock	18	TMDS RX0+
7	DDC Data	19	TMDS Ground
8	Floating	20	Floating
9	TMDS RX1-	21	Floating
10	TMDS RX1+	22	TMDS Ground
11	TMDS Ground	23	TMDS Clock+
12	Floating	24	TMDS Clock-

3.2.3 Video performance

Item	Condition	Spec	OK	N.A	Remark
Max. support Pixel rate		135 MHz	√		Both for analog and digital inputs
Max. Resolution		1366 x 768	√		Both for analog and digital inputs
Rise time + Fall time		< 5 ms (50% of minimum pixel clock period)	√		1366 x 768 @ 60Hz (max. support timing)
Settling Time after overshoot /undershoot		< 5% final full-scale value	√		Refer to VESA VSIS Standard V1R1
Overshoot/Undershoot		< 12% of step function voltage level over the full voltage range	√		Refer to VESA VSIS Standard V1R1

3.2.4 Scan range

Item	Condition	Spec	OK	N.A	Remark
Horizontal		31-80KHz	√		
Vertical		55-76 Hz	√		

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3.2.5 Plug & Play DDC2B DDC-CI Support

Item	Condition	Spec	OK	N.A	Remark
DDC channel type		DDC2B	√		
EDID		Version 1.3	√		Refer to S/W spec. document to see the detailed EDID data definition.
DDC-CI		Version 1.1 or Later	√		Refer to S/W spec

3.2.6 Support Timings

Mode	Resolution (active dot)	Resolution (total dot)	Horizontal Frequency (KHz)	Vertical Frequency (Hz)	Nominal Pixel Clock (MHz)
	640x480@60Hz	800 x 525	31.469	59.941	25.175
	640x480@72Hz	832 x 520	37.861	72.809	31.500
	640x480@75Hz	840 x 500	37.500	75.000	31.500
MAC	640x480@66.66Hz	864x525	35	66.66	30.24
VESA	720x400@70Hz	900x449	31.469	70.087	28.322
SVGA	800x600@56Hz	1024 x 625	35.156	56.250	36.000
	800x600@60Hz	1056 x 628	37.879	60.317	40.000
	800x600@75Hz	1056x625	46.875	75.000	49.500
MAC	832x624@74.55Hz	1152x667	49.722	74.55	57.28
XGA	1024x768@60Hz	1344x806	48.363	60.004	65.000
	1024x768@70Hz	1328x806	56.476	70.069	75.000
	1024x768@75Hz	1312x800	60.023	75.029	78.750
MAC	1152x870@75Hz	1568x909	68.700	75.000	84.520
VESA	1152x864@75Hz	1600x900	67.5	75	108
	1280x960@60Hz	1800x1000	60	60	108
SXGA	1280x1024@60Hz	1688x1066	63.981	60.020	108.000
	1280x1024@75Hz	1688x1066	79.976	75.025	135.000
VESA	1280x720@60Hz	1650x750	44.955	59.940	74.176
	1280x768@60Hz	1664x798	47.776	59.870	79.500
	1280x768@75Hz	1696x805	60.289	74.893	102.250
WXGA	1280x800@60Hz	1680x831	49.702	59.81	83.5
	1366x768@60Hz	1792x798	47.712	59.79	85.5

Note:

1. Show "Input Not Supported" warning message. When Vertical Frequency is over 76Hz or under 55Hz, but Pixel Clock is between 25.175MHz and 135MHz, the monitor can show image, and the same time has "Input Not Supported" warning message. If Pixel Clock is over the range of 25.175MHz ~ 135MHz, the display is Black and show warning message.
2. If Hf /Vf is set in the range of 31KHz~80KHz and 55Hz ~76Hz, and Pixel Clock is set in the range of 25.175MHz~135MHz, but is not the above Resolution, then it will display the nearest mode.

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3.3. Operational & Functional Specification

3.3.1 Video performance

***All spec. of monitor need to warm up at least 1hr.**

Item	Condition	Spec	OK	N. A	Remark
Resolution	Any input resolution modes which are under 1366x768	1366x768	√		
Contrast ratio		600(min),1000(typ)	√		Test Condition: Set Contrast at 50, Brightness at 100, Color at User preset.
Brightness	At R/G/B saturated condition	300 cd/m^2 (typ.),240(min)	√		Test Condition : Set contrast at 100 , brightness at 100 , color at User preset.
Response time	Rising + Falling time	On/off:5 ms (typ.),8ms(max)	√		Test Equipment: Westar TRD 100 or equal level equipment ;
Viewing angle	At Contrast ratio = 10	R/L: 85/85 degrees (typ.) 75/75 degrees (min)	√		
	At Contrast ratio = 10	U/D: 80/80 degrees (typ.) 70/70 degress(min)	√		
CIE coordinate of White		(0.313, 0.329) +/- (0.03, 0.03)	√		
Display colors		16.7 Millions colors	√		6 bit+HiFRC

3.3.2 Brightness Adjustable Range

Item	Condition	Spec	OK	N. A	Remark
Brightness adjustable range	At default contrast level (saturate point) & Full-white color pattern	(Max. brightness value – Min. brightness value) ≧ 100 cd/m^2	√		

3.3.3 Acoustical Noise

Item	Condition	Spec	OK	N. A	Remark
Acoustical Noise	At 30cm distance	≦ 22dB/A	√		
	At 5cm distance	≦35dB	√		Need to test if system acoustic test is failed. Monitor internal key components (power, inverter, panel...)

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3.3.4 Environment

Item	Condition	Spec	OK	N. A	Remark
Temperature	Operating	0 ~ +40 ℃	√		
	Non-operating	-20 ~ +60 ℃	√		
Humidity	Operating	10 ~ 90%	√		Non-condensing
	Non-operating	10 ~ 90%	√		Non-condensing
Altitude	Operating	12,000(ft)	√		at 25℃ (hold 3.5 hrs)
	Non-operating	40,000(ft)	√		at -30 ℃ (hold 1 hr)

3.3.5 Transportation

Item	Condition	Spec	OK	N. A	Remark
(1) Vibration	Package, Non-Operating	Test Specification: 1. Frequency Hertz 5 ~ 250 HZ , PSD Level 0.0054 (G2/Hz) 2. Grms = 1.146 3. Sweep Time : 30 minutes per Axis 4. Axes : X,Y,Z	√		
(2) Unpackaged Vibration	Unpackaged, Non-Operating	Test Spectrum: 20 Hz 0.0185(g2/Hz) 200Hz 0.0185(g2/Hz) Duration : 5 Minutes Axis : 3 axis (Horizontal and Vertical axis ,Z axis)			
(3) Drop	Package, Non-Operating	76 cm Height (MP stage) (1 corner, 3 edges, 6 faces)	√		
(4) Shock	Wooden package, Non-Operating	1. Amplitude : Half sine-wave 50G 2. Duration : 10 ms 3. Test Times : 1 4.Test Sides : All 6 Sides	√		

3.3.6 Electrostatic Discharge Requirements

Item	Condition	Spec	OK	N. A	Remark
Electrostatic Discharge	IEC801-2 standard	Contact: 8KV Air: 15KV	√		

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3.3.7 EMC

Item	Condition	Spec	OK	N. A	Remark
TCO03	Electric	Band 1 < 10 V/m Band 2 < 1 V/m	√		
	Magnetic	Band 1 < 200nT Band 2 < 25nT	√		
EMI	FCC part 15J class B	After Mass production under 1dBuv for constant measure. Besides DNSF and VCCI class-2 are optional.	√		
	EN55022 class B				

3.3.8 Reliability

Item	Condition	Spec	OK	N. A	Remark
MTBF Prediction	Follow Qisda Generic Spec	> 25,000 Hours	√		Excluding CCFL
CCFL Life time	At 25℃, under 6.5mA	40,000 Hours (min)	√		See Note-4

Note-4: CCFL lifetime is determined as the time at which brightness of lamp is 50%. The typical lifetime of CCFL is on the condition of 7.5mA CCFL current and 25±2℃.

3.3.9 Audio performance

Item	Condition	Spec	OK	N. A	Remark
Preamp + Power amp					
(1)Output power		1 W rms/CH @ 1KHz		√	
(2)THD (@ 1W)		<1%		√	
(3)S/N ratio		>40dB		√	
Speaker Driver					
(1)Nominal impedance		8 ohm		√	
(2)Rated input power		1 W/CH		√	
(3)Frequency response		500~20KHz SPL-10dB		√	
(4)Output sound pressure level		80 ± 3 dB (1W 0.5M)		√	
(5)Dimension of box		63x25x13mm^2		√	
Audio Control					
(1)Volume range		0 ~100 levels		√	
(2)Mute		On/Off		√	

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3.4. LCD Characteristics

3.4.1 The Physical definition & Technology summary of LCD panel

AUO M185XW01 V0

Item	Condition	Spec	OK	N. A	Remark
LCD Panel Supplier		AUO	√		
Panel type of Supplier		M185XW01 V0	√		
Screen Diagonal		470.1 mm(18.5"W)	√		
Display area	Unit=mm	409.8(H) x230.4(V)	√		
Physical Size	Unit=mm	430.37(H) x254.6(V) x 16.5(D)	√		
Weight	Unit=gram	2000(Max)	√		
Technology		TN type	√		
Pixel pitch	Unit=mm	0.3(H) x 0.3(W)	√		Per one triad
Pixel arrangement		R/G/B vertical stripe	√		
Display mode		Normally White	√		
Support color		16.7Millions colors	√		6 bit + HiFRC

3.4.2 Optical characteristics of LCD panel

AUO M185XW01 V.0

Item	Unit	Conditions	Min.	Typ.	Max.	Remark
Viewing Angle	[degree]	Horizontal (Right)	75	85	-	
	[degree]	CR = 10 (Left)	75	85	-	
	[degree]	Vertical (Up)	70	80	-	
	[degree]	CR = 10 (Down)	70	80	-	
Contrast ratio		Normal Direction	600	1000		
Response Time	[msec]	Rising Time	-	3.6	5.7	
	[msec]	Falling Time	-	1.4	2.3	
	[msec]	Rising + Falling	-	5	8	
Color / Chromaticity Coordinates (CIE)		Red x	0.618	0.648	0.678	
		Red y	0.309	0.339	0.369	
		Green x	0.262	0.292	0.322	
		Green y	0.573	0.603	0.633	
		Blue x	0.113	0.143	0.173	
		Blue y	0.040	0.070	0.100	
Color Coordinates (CIE) White		White x	0.283	0.313	0.343	
		White y	0.299	0.329	0.359	
Luminance Uniformity	[%]	9 points measurement	75	80		
White Luminance @ CCFL 7.50mA (center)	[cd/m^2]		240	300	-	
Crosstalk (in 75Hz)	[%]				1.5	

* The test methods for the above items' definition, please refer to the relative panel specification.

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3.5. User Controls

3.5.1 User's hardware control definition

Item	Condition	Spec	OK	N.A	Remark
Power button			√		
Auto button(Exit button)			√		
Right/Inc. button			√		
Left/Dec. button			√		
Menu button			√		
Mode button				√	
Input Select button				√	
E-Key button			√		
Mute button				√	

3.5.2 OSD control function definition

Item	Condition	Spec	OK	N.A	Remark
Auto Adjust		Auto-Geometry	√		
Brightness			√		
Contrast			√		
Horizontal Position			√		
Vertical Position			√		
Pixel Clock			√		
Phase			√		
Color		Cool:色溫 9300 Warm:色溫 6500 User: Separate R/G/B adjustment Reset Color	√		
OSD Position		OSD Horizontal position OSD Vertical position	√		
OSD Time		From 10 sec to 120 sec	√		
OSD Lock				√	
Language		EMEA/Non-EMEA languages for Asia/Europe Version	√		
Recall		Recall All	√		
Mode		Acer Empower Mode	√		
Input Select		D-sub DVI	√		
Sharpness				√	
Display Information		For input timing	√		
Volume				√	
Mute				√	
Hot key for Auto			√		
Hot key for Contrast				√	
Hot key for Volume				√	
Hot key for Input Select				√	
Hot key for Mode				√	

The detailed firmware functions' specification, please refer to C212 S/W spec. document.

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3.6. Mechanical Characteristics

3.6.1 Dimension

Item	Condition	Spec	OK	N.A	Remark
Bezel opening		**411.7*232.3 mm**	√		
Monitor without Stand	W x H x D mm	**456.41*280.56*68.46mm**	√		
Monitor with Stand	W x H x D mm	**456.41*334.54*163.72mm**	√		
Carton Box (outside)	L x W x H mm	**504*126*394mm**	√		
Tilt and Swivel range		**Tilt: -5 ~ +15 degree Swivel: 0 degree**	√		

3.6.2 Weight

Item	Condition	Spec	OK	N.A	Remark
Monitor (Net)		**3.56Kg**	√		
Monitor with packing (Gross)		**4.22Kg**	√		

3.6.3 Plastic

Item	Condition	Spec	OK	N.A	Remark
Flammability		**>ABS<,94-HB**	√		
Heat deflection To	**ABS**	65 ℃	√		
UV stability	**ABS**	**Delta E < 8.0**	√		
Resin		BEZEL: PMMA+ABS UC,BASE:ABS (Bezel:Cheil/BF-0677F, LG/XG586,BASF/ BX13036) Other: HF380/SD0150)	√		
Texture		**UC:AT-IM-D02; Bezel: AT-IM-D01**	√		
Color		**BEZEL : DB19A; UC: DB19A**	√		

3.6.4 Carton

Item	Condition	Spec	OK	N.A	Remark
Color		**Kraft**	√		
Material		**B Flute**	√		
Compression strength		**200KGF**	√		
Burst Strength		**16 KGF/cm^2**	√		
Stacked quantity		4 Layers Vertical +2 layers H	√		

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3.7. Pallet & Shipment

3.7.1 Container Specification

Stowing Type	ontainer	Quantity of products (sets) (Every container)	Quantity of Products (sets) (Every Pallet)	Quantity of pallet (sets) (Every Container)
With pallet	20'	**940**	**Pallet A: 94**	**Pallet A: 10**
			Pallet B:	**Pallet B:**
	40'	**2068**	**Pallet A: 94**	**Pallet A: 22**
			Pallet B:	**Pallet B:**
Without pallet	20'		**X**	**X**
			X	**X**
	40'		**X**	**X**
			X	**X**

3.7.2 Carton Specification

3.7.2.1 Product:

Net Weight (Kg)	Gross Weight (Kg)	Dimension w/o Base W*H*D (mm)	Dimension w/ Base W*H*D (mm)
3.56Kg	4.22Kg	456.41*280.56*68.46mm	456.41*334.54*163.72mm

3.7.2.2Package:

Carton Interior Dimension (mm) L*W*H	Carton External Dimension (mm) L*W*H
496*117*379mm	504*126*394mm

3.8. Certification

Item	Condition	Spec	OK	N.A	Remark
Environment	Green design	API Doc. 715-C49	√		ISO14000 Requirement
	Blue Angel	German Standard		√	
	E-2000	Switzerland		√	
	EPA	USA Standard	√		
	TCO'99			√	
	TCO'03		√		
	MPR2		√		
	Green Mark		√		
PC-Monitor	Microsoft Windows	PC98/99	√		
	DPMS	VESA	√		
	DDC 2B	Version 1.3	√		
	USB	External		√	
Safety	UL (USA)	UL60950 3rd edition	√		
	CSA (Canada)	CAN/CSA-C22.2 No. 60950	√		
	Nordic / D.N.S.F	EN60950		√	

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	FIMKO	EN60950		√	
	CE Mark	73/23/EEC	√		
	CB	IEC60950	√		
	CB	EN60950	√		
	TUV/GS	EN60950 / EK1-ITB 2000:2003	√		
	CCC (China)	CB4943	√		
	GOST	EN60950	√		
	TUV type-approved		√		
	SASO	IEC60950	√		
EMC	CE Mark	89/336/EEC	√		
	FCC (USA)	FCC Part 15 B	√		
	EN55022	Class B		√	
	CISPR 22	Class B		√	
	VCCI (Japan)	VCCI Class B	√		
	BSMI (Taiwan)	CNS 13438	√		
	C-Tick (Australia)	AS/ NZS CISPR22	√		
X- Ray Requirement	DHHS (21 CFR)	USA X- Ray Standard		√	
	DNHW			√	
	PTB	German X- Ray standard		√	
Ergonomics	TUV / Ergo		√		
	ISO 13406-2		√		
	prEN50279			√	

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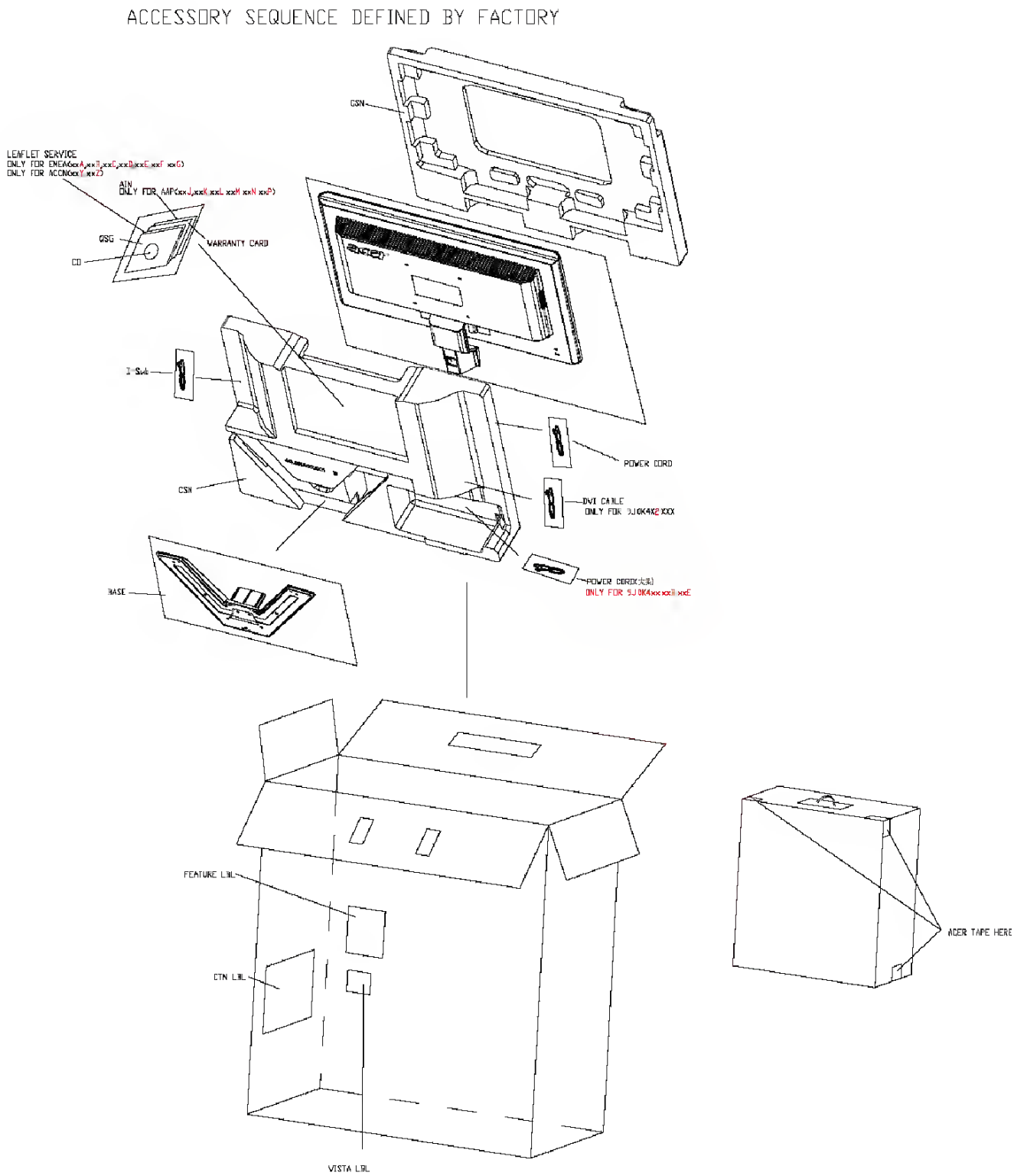
3.9 Packing



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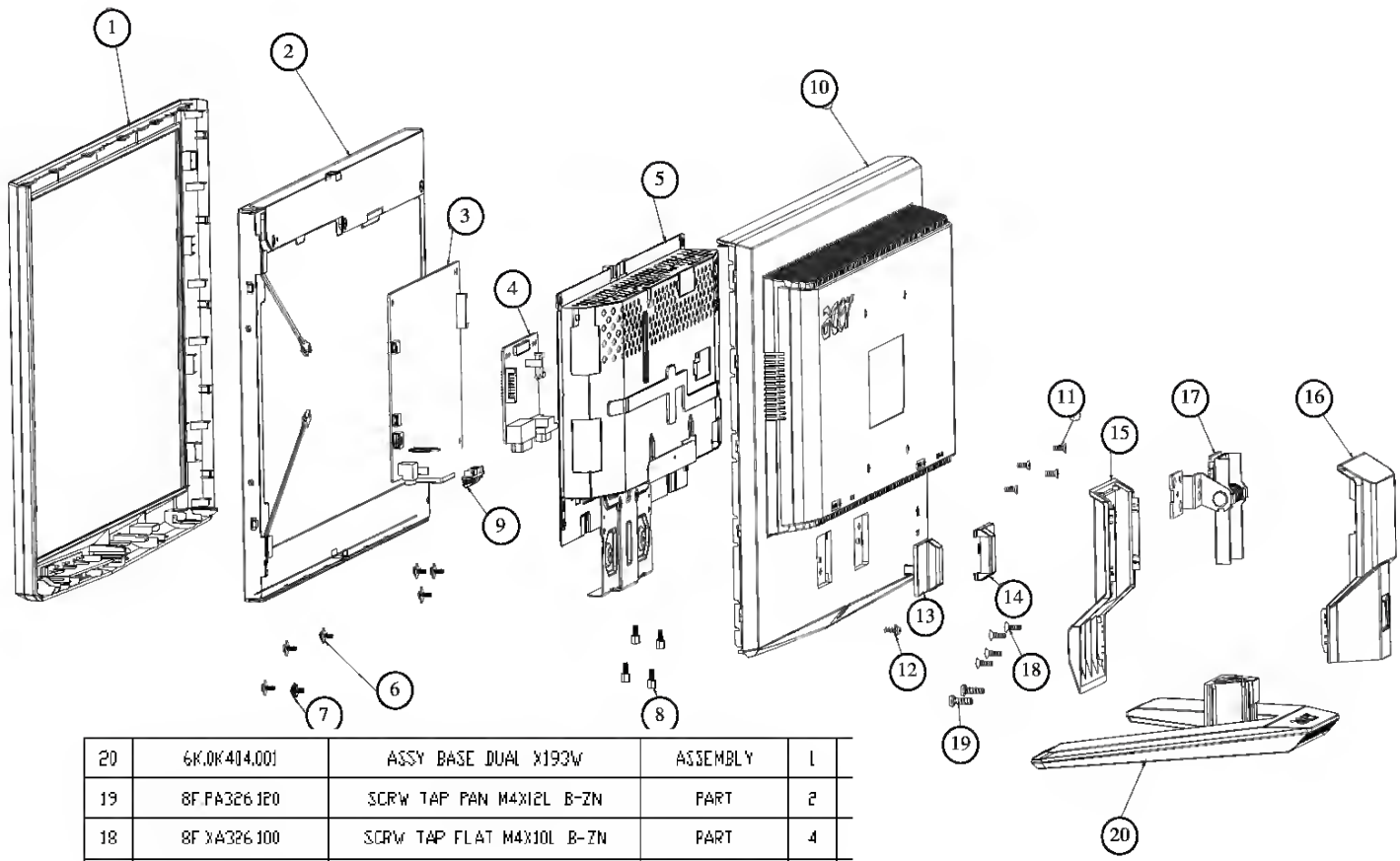
4. Disassembly /Assembly

4.1. Exploded View



ITEM	PART NO	DESCRIPTION	TYPE	QTY
20	6K.0K404.001	ASSY BASE DUAL X193W	ASSEMBLY	1
19	8F.PA326.1P0	SCRW TAP PAN M4X12L B-ZN	PART	2
18	8F.XA326.100	SCRW TAP FLAT M4X10L B-ZN	PART	4
17	6K.0K423.001	ASSY HINGE X193	ASSEMBLY	1
16	4B.0K402.001	CLM-R X193W	PART	1
15	4B.0K401.001	CLM-L X193W	PART	1
14	4B.0GT06.012	CVR HINGE R	PART	1
13	4B.0GT05.012	CVR HINGE L	PART	1
12	8F.WA314.8R0	SCRW TAP CAP M3X134PX8L B-ZN	PART	1
11	8F.5A456.8R0	SCRW MACH FLAT M4X8L C-ZN NYLO	PART	4
10	6K.0NA03.001	ASSY RC DUAL	ASSEMBLY	1
9	4B.12H12.012	CVR AC-SOCKET	PART	1
8	8F.20594.019	SCRW MACH STEEL HEXH4-40 NI	PART	4
7	8F.VZ524.6R0	SCRW TAP FLAT+EXT M3X6L C-ZN	PART	1
6	8F.00273.6R0	SCRW TAP PH F/10WSH M3X6L C-ZN	PART	6
5	6K.0NA05.001	ASSY SHD X193HD	ASSEMBLY	1
4	5E.0NA03.XXX	I/F-BD	ASSEMBLY	1
3	5E.0NA02.XXX	PWR-BD	ASSEMBLY	1
2	5F.LUHV0.001	LCDM18.5W M185XW01-V0 Z AUO	PART	1
1	6K.0NA01.001	ASSY BZL X193HD	ASSEMBLY	1

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4.2. Disassembly /Assembly

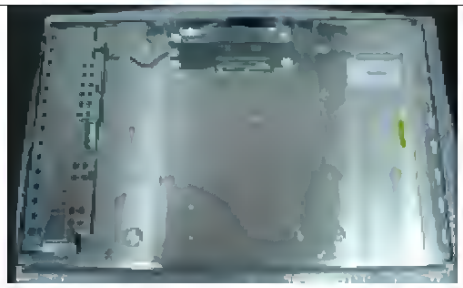
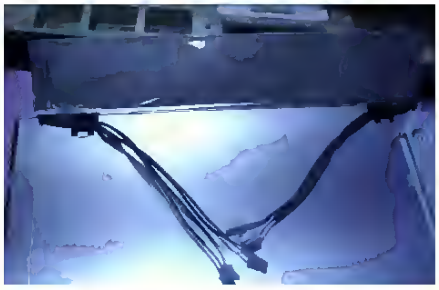
Assembly SOP

Preparation before assemble

1. Clean the room for work

2. Identify the area for material

3. Prepare the implement, equipments, material as bellow:
   1) Press-fixture
   2) Working table
   3) Screw-driver
   4) Knife*1
   5) Glove
   6) Cleaning cloth
   7) ESD protection

item	picture	Operation	Tool	Notes
1		Put panel on the cushion carefully,		
2		Stick a big Al tape to panel which can protect the WIRE.		
3		Check and put CLM-F on the cushion carefully,		

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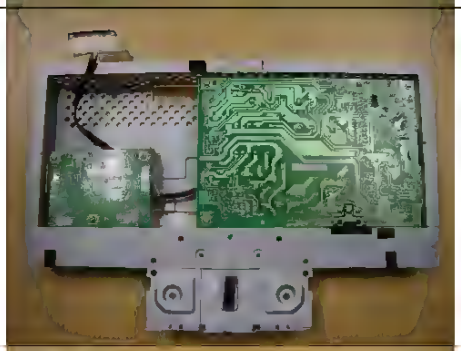
4		Assemble the panel on CLM-F.		Go to with Left.
5		Assemble PCBA		
6		Assemble the PCBA to Main-Chassis		
7		Fix the SPS board by 3 screws.	Screw-driver 7+1Kg*cm Hole size: ¢ 2.68±0.03 Screw head: #2 Length:60-80	Attention the order by one to three.
8		Lock screws of FLAT+EXT and fix the I/F board by 2 screws.	Screw-driver 7+1Kg*cm Hole size: ¢ 2.68±0.03 Screw head: #2 Length:60-80	Attention the order by one to three.

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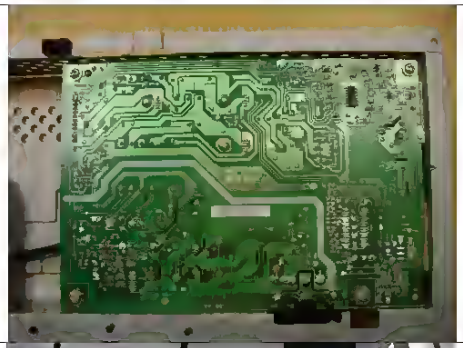
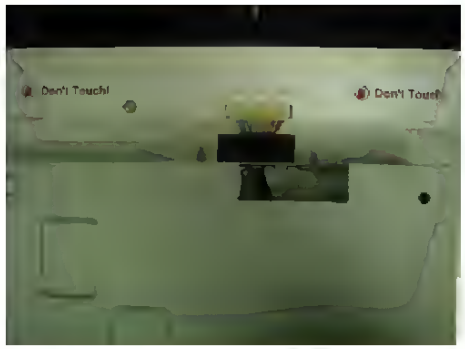
9		Fasten the AC-socket to Main-Chassis		
10		Lock screws of side on Main-Chassis with 2/4,based on DVI.	Screw-driver 5±0.6Kg*cm Hole size: #4-40 Screw head: #2 Length:60-80	Attention the order by one to three.
11		Fasten the LVDS to panel		
12		Stick an Y tape to fix the LVDS cable		

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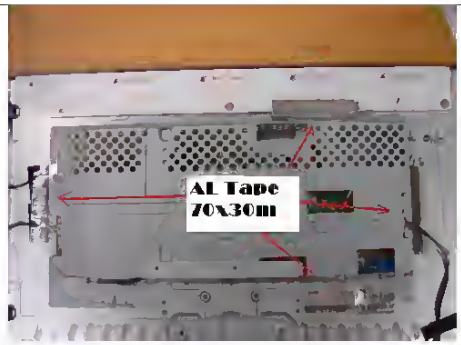
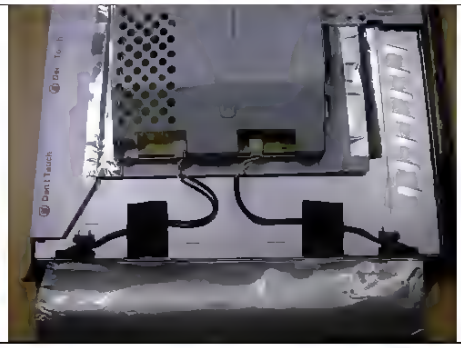
13		Stick four AL tape to Main-Chassis		Attention the order and position.
14		Insect the inverter wire and stick an acetic tape to fix the wire one by one.		
15		Assemble PCBA of ctrl BD and insect the inverter wire for connection with CLM-F and AC-socket, and stick an acetic tape to fix the wire at last.		
16		Check and put CLM-F on the Main-Chassis carefully,then Assemble the Rear Cover.	Screw-driver： 5.0±1.0Kg*cm Hole size: ¢ 2.35±0.05 Screw head: #2 Length:60-80	

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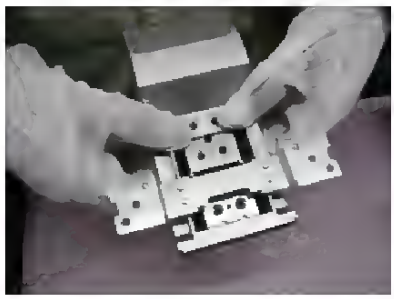
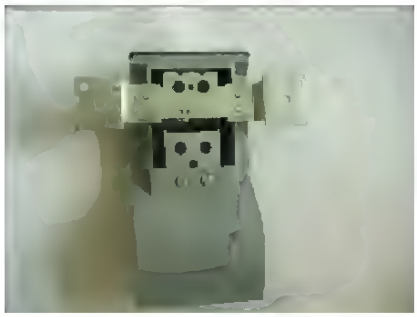
17		Assemble bracket , Cover the cover board at last.		Attention L or R.
18		Assemble with shackles.		
19		Lock 2 screws for fasteness.	Screw-driver：7.5+0.5Kg*cm Hole size: ¢ 3.35±0.05 Screw head: #2 Length:60-80	
20		Lock 4 screws to RC.	Screw-driver：7.5+0.5Kg*cm Hole size: ¢ 3.35±0.05 Screw head: #2 Length:60-80	
21		Cover the CLM of L and R		

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Disassembly SOP

Preparation before disassemble

1. Clean the room for disassemble

2. Identify the area for monitor

3. Check the position that the monitors be placed and the quantity of the monitor; prepare the area for material flow; according to the actual condition plan the disassemble layout

4. Prepare the implement, equipments, material as bellow:
   1) Press-fixture
   2) Working table
   3) Screw-driver
   4) Knife*1
   5) Glove
   6) Cleaning cloth
   7) ESD protection

item	picture	Operation	Tool	Notes
1		Prize up the cover.		Unsharpness.
2		Disassemble the stand → 4 screws	Screw-driver： 7.5+0.5Kg*cm Screw head: ＃2	
3		Disassembly the bezel from the monitor, notice the disassembly order : 1.Left (1) parts of bezel 2.Top (2) parts of bezel 3.Bottom (3) parts of bezel 4. Right (4) parts of bezel Don't draw the BZL		When disassembly the bezel ,notice don't bend the C/B .man must wear glove The purpose is loose the BZL

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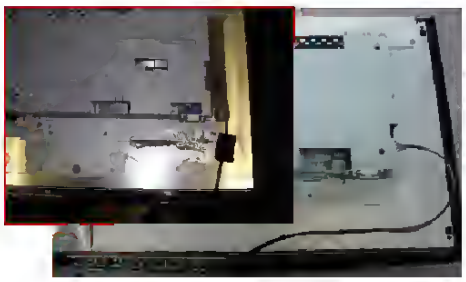
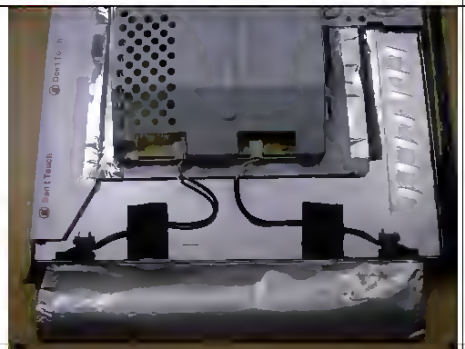
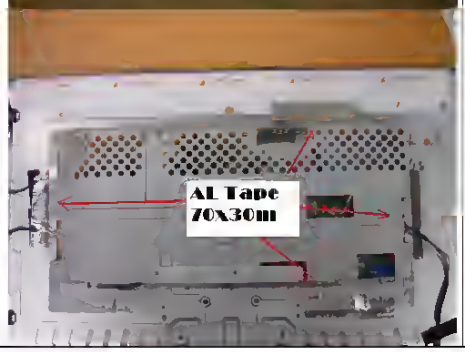
4		Turn over the monitor ,dismantle the Rear cover from the monitor.	Screw-driver：5.0±1.0Kg*cm Screw head: #2	Don't draw the BZL
5		Disassembled the ctrl BD wire shielding and one acetic tapes.		
6		Tear off these two acetic tapes. Kick off the wire.		
7		Take the entire internal mechanism from Bezel and then put it on the cushion.		
8		Tear off these four AL tapes.		

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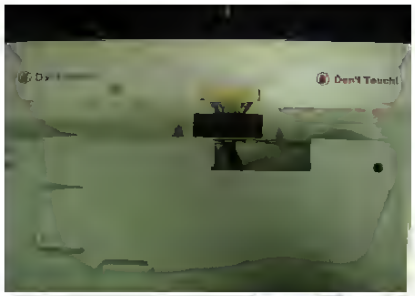
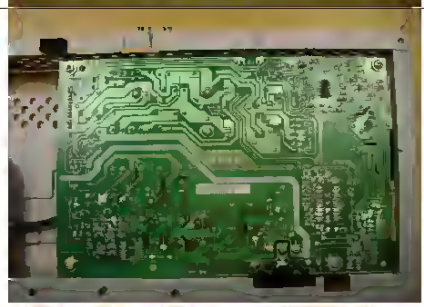
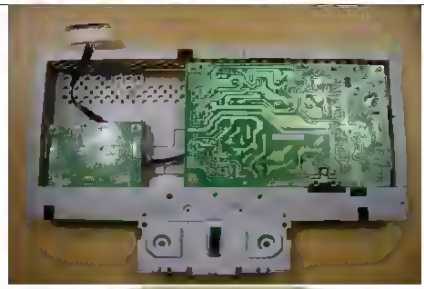
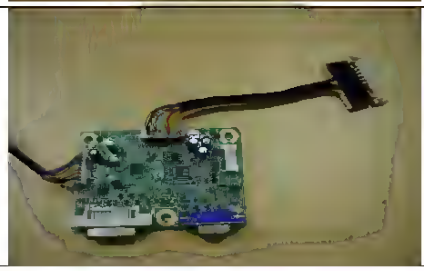
9		Tear off these Y tapes.		
10		Pull out these wires.		
11		Disassembled the screws : 2/4 screws , based on DVI.	Screw-driver 5+0.6Kg*cm Screw head: #2	
12		Disassembled these AC-socket to Main-Chassis.		
13		Disassembled these screws which fixed the I/F and SPS board. → 6 Screws	Screw-driver : 7+1Kg*cm Screw head: #2	
14		Disassemble the board and pull out these wires.		

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5. Level 1 Cosmetic / Appearance / Alignment Service

5.1 Alignment procedure (for function adjustment)

A list of necessary alignments for the LCD monitor:

Items	Description	Remark
1	Timing adjustment	Preset timing
2	White balance adjustment	1. Burn In: On 2. User Mode 3. SXGA 1024 1280X1024@75Hz Pattern 42(5-Mosaic)
3	Color temperature adjustment	Cool (9300K) Warm(6500K) User
4	Writing EDID file	Analog and Digital

5.1.1 Preparation:

1. Setup input timing to any preset mods or patterns.
2. Enter factory mode (press "e-Key" then press "power" button to turn on monitor).
3. Move Black cursor into "BURN IN MODE" tag and select "ON" to enable burn-in mode.
4. Power off the monitor, remove the input source and then power on again.
5. Setup unit and keep it warm up for at least 30 minutes.

5.1.2 Timing adjustment: (Analog only, it is not required for DVI-D input source)

1. Enter factory mode (press "e-Key" then press "power" button to turn on monitor).
2. Select timing mode from table 1 and input full screen display pattern to monitor.
3. Press "Auto-Key" to run "AUTO adjustment" function for geometry adjustment.
4. Clear user area in EEPROM.
5. Check if the position, phase and clock of the image are ok or acceptable to make sure function and performance are ok.
6. Turn off the monitor power.
7. Turn on the monitor power again to check if monitor's image settings are ok and with following settings.

CONTRAST = 50
BRIGHTNESS = 85
COLOR = Warm (default setting)

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Figure-1: Preset Timing modes list

Mode	Resolution (active dot)	Resolution (total dot)	Horizontal Frequency (KHz)	Vertical Frequency (Hz)	Nominal Pixel Clock (MHz)
	640x480@60Hz	800 x 525	31.469	59.941	25.175
	640x480@72Hz	832 x 520	37.861	72.809	31.500
	640x480@75Hz	840 x 500	37.500	75.000	31.500
MAC	640x480@66.66Hz	864x525	35	66.66	30.24
VESA	720x400@70Hz	900x449	31.469	70.087	28.322
SVGA	800x600@56Hz	1024 x 625	35.156	56.250	36.000
	800x600@60Hz	1056 x 628	37.879	60.317	40.000
	800x600@75Hz	1056x625	46.875	75.000	49.500
MAC	832x624@74.55Hz	1152x667	49.722	74.55	57.28
XGA	1024x768@60Hz	1344x806	48.363	60.004	65.000
	1024x768@70Hz	1328x806	56.476	70.069	75.000
	1024x768@75Hz	1312x800	60.023	75.029	78.750
MAC	1152x870@75Hz	1568x909	68.700	75.000	84.520
VESA	1152x864@75Hz	1600x900	67.5	75	108
	1280x960@60Hz	1800x1000	60	60	108
SXGA	1280x1024@60Hz	1688x1066	63.981	60.020	108.000
	1280x1024@75Hz	1688x1066	79.976	75.025	135.000
VESA	1280x720@60Hz	1650x750	44.955	59.940	74.176
	1280x768@60Hz	1664x798	47.776	59.870	79.500
	1280x768@75Hz	1696x805	60.289	74.893	102.250
WXGA	1280x800@60Hz	1680x831	49.702	59.81	83.5
	1366x768@60Hz	1792x798	47.712	59.79	85.5

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5.1.3 Auto color balance adjustment:
(Analog only, it is not required for DVI-D input source)

1. Setup input timing SXGA (1280x1024@75), pattern 42(5-Mosaic pattern with white color frame) with Analog signals from Chroma video pattern generator.
2. Enter factory mode (press "e-Key" then press "power" button to turn on monitor).
3. Move black cursor into "BURN IN MODE" tag and select "ON" to enable burn-in mode, then left OSD menu.
4. Press " Left Key " button to do white balance for auto color balance adjustment (will get optimal gain / offset (clamp) values).

5.1.4 Color adjustment:

1. Setup input timing to any preset modes, pattern 41(full white color pattern) with Analog signals from Chroma video pattern generator.
2. Enter factory mode (press "e-Key" then press "power" button to turn on monitor).
3. Confirm auto color balance adjustment had already been done.
4. Measure each color temperature (Cool&Warm) by Minolta CA-110 (or equivalent equipment).
5. Two methods can be used to adjust RED, GREEN, BLUE value of each color temperature, Cool&Warm to meet following spec requirement, the 1st method is by using external PC and IIC alignment protocol to do automatic adjustment, and the 2nd method is by manually and must be in factory mode.

Color temperature (Cool set on OSD)	X+-	0.283+(-) 0.03
	Y+-	0.297+(-) 0.03
Color temperature (Warm set on OSD)	X+-	0.313+(-) 0.03
	Y+-	0.329+(-) 0.03

6. Turns off the monitor power.

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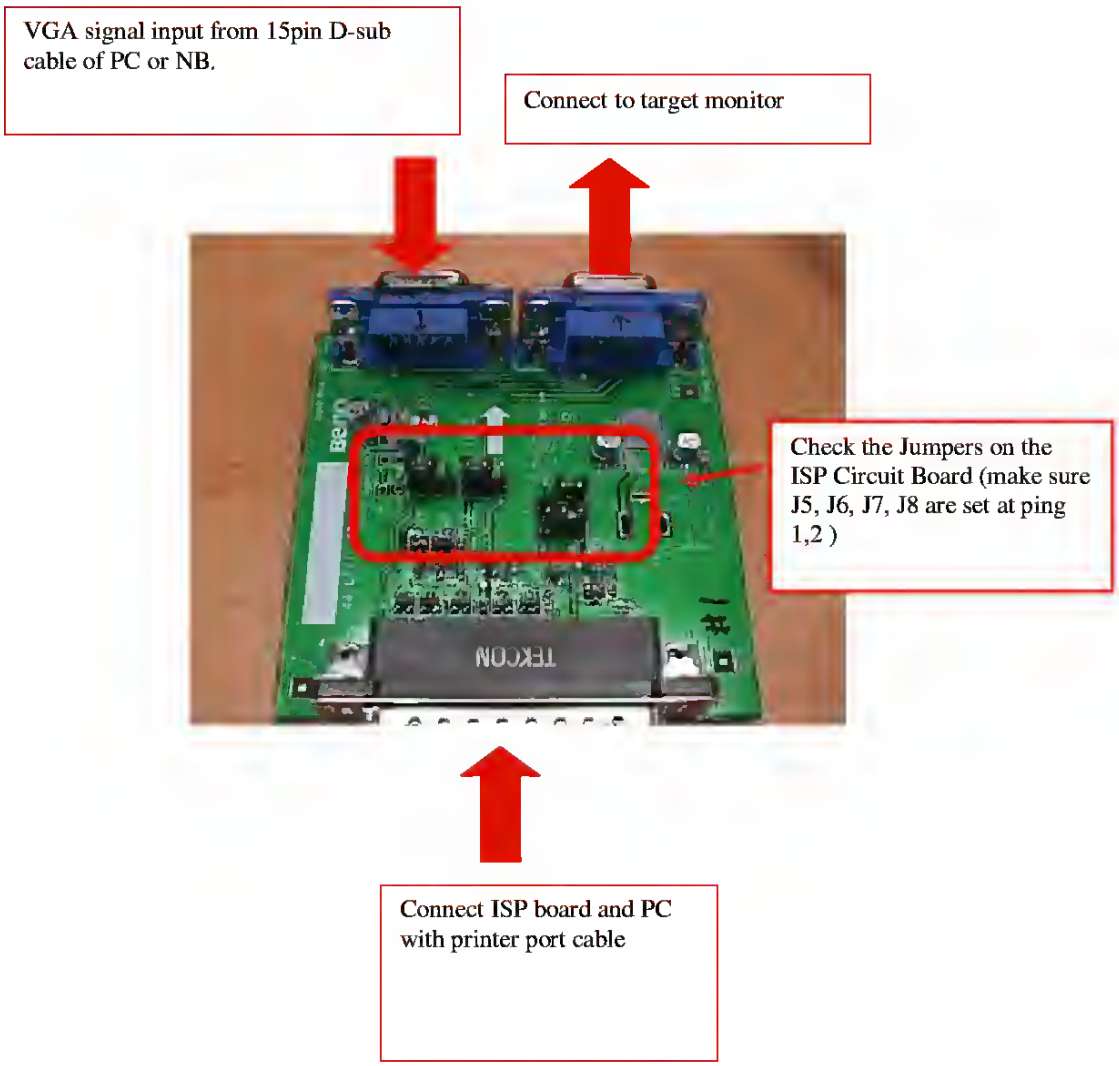
5.2 Software / Firmware Upgrade Process

5.2.1 Hardware prepared:

Hardware Requirement:

1. ISP board x 1


VGA signal input from 15pin D-sub cable of PC or NB.
Connect to target monitor
Check the Jumpers on the ISP Circuit Board (make sure J5, J6, J7, J8 are set at ping 1,2)
Connect ISP board and PC with printer port cable

2. DSUB VGA cables x 2
3. Printer cable (with one male connector and another female connector) x 1.
4. PC or Notebook with parallel (printer) port x1.

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5.2.2 Firmware Upgrade Procedure

Step 1:

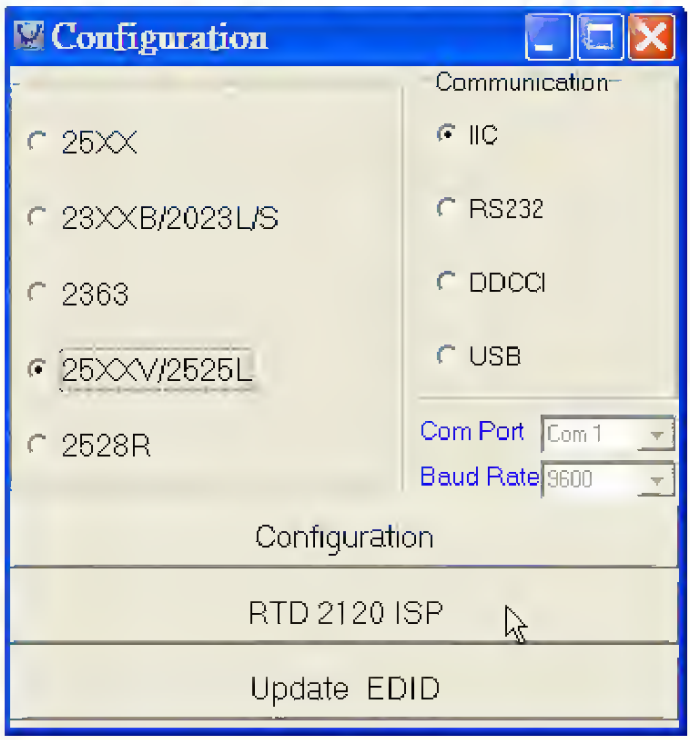
Un-zip Port95nt and install into your computer.

Step 2:

Un-zip ISP application tool (RTDTool)

Step 3:

Press “RTD 2120 ISP” button to execute firmware program application.



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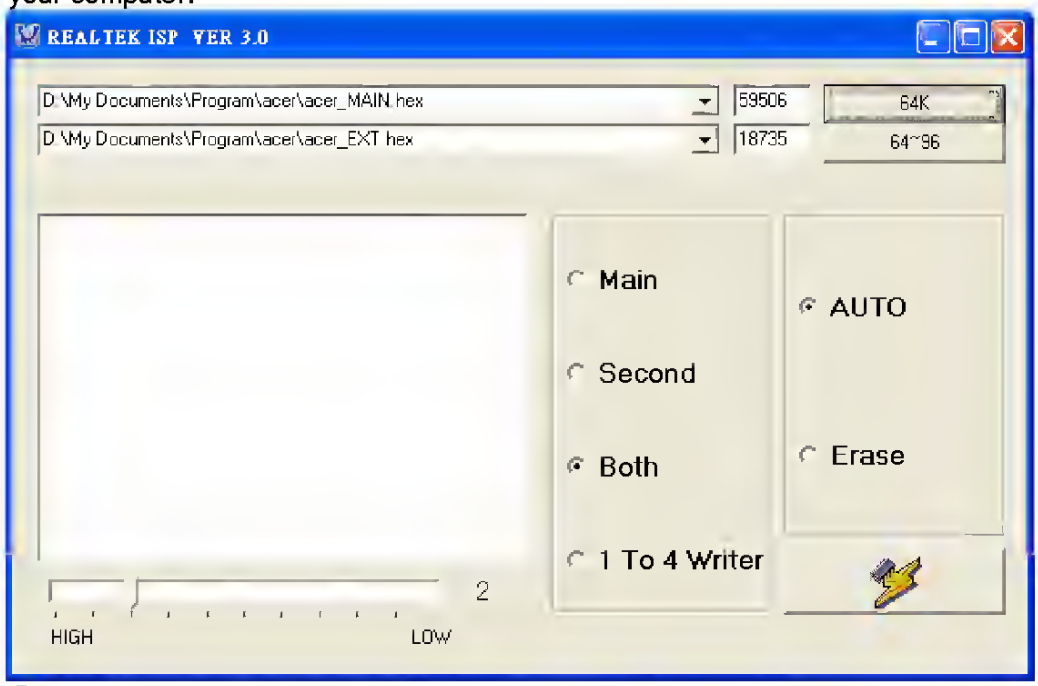
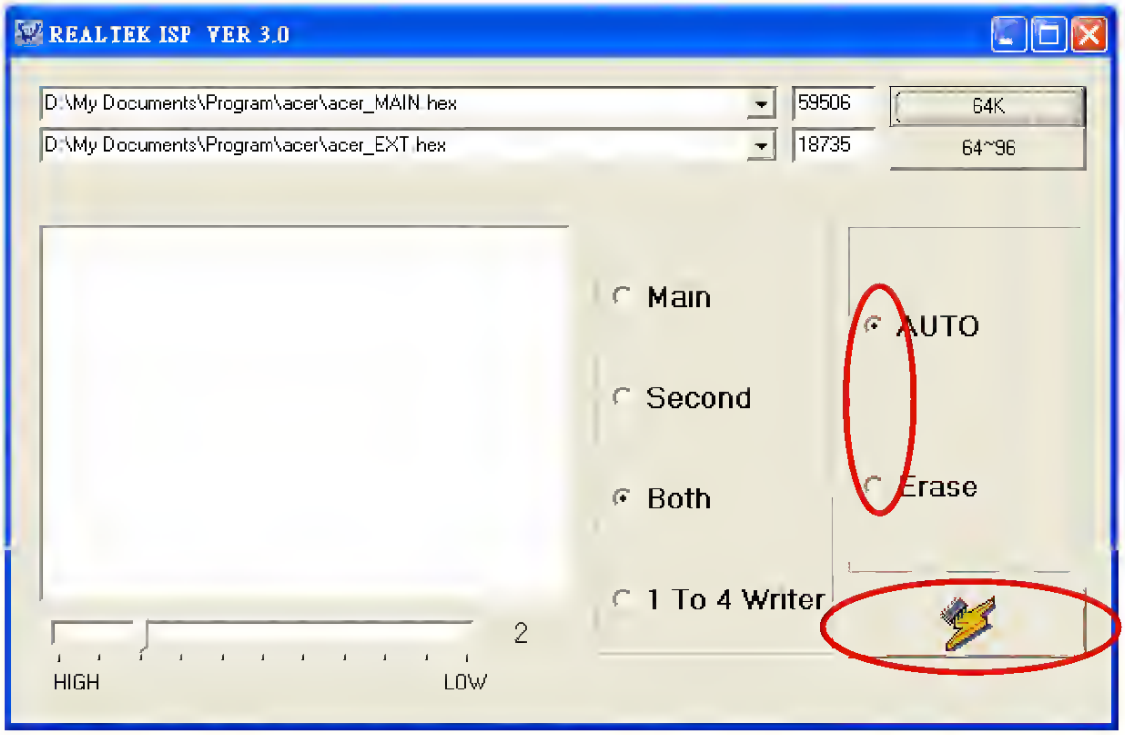
Step 4:

Press “64K” button to load *series*.hex file and press “64~96” button to load *extend*.hex file from your computer.



Step 5:

Select “Erase” option and execute lightning button first, and then select “Auto” option and execute lightning button to start upgrade firmware to the monitor.



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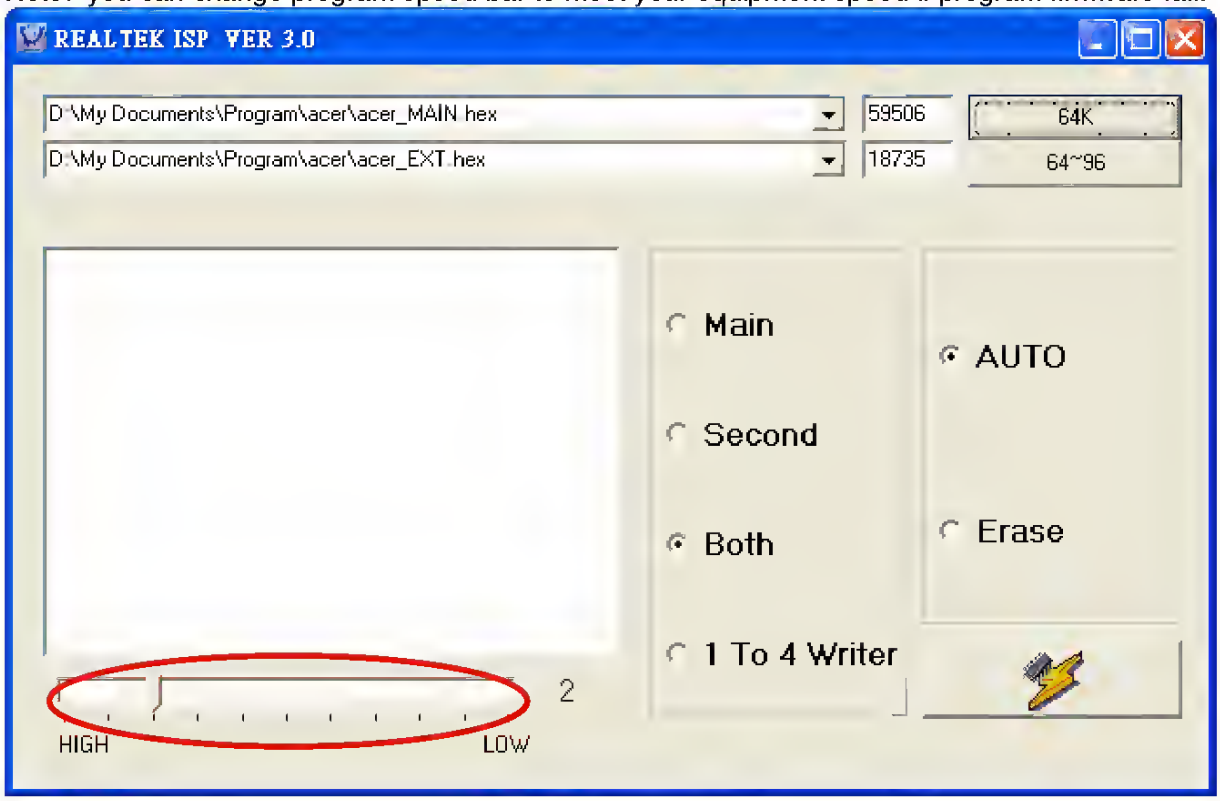
Note: you can change program speed bar to meet your equipment speed if program firmware fail.



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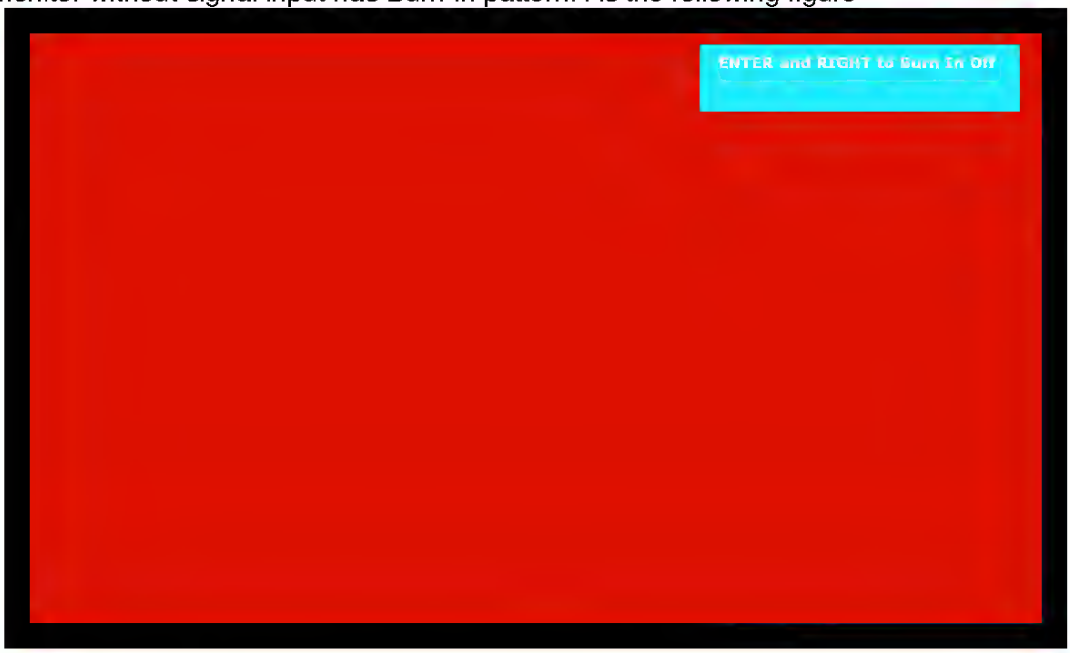
5.2.3 Turn Off Burn In

IF the monitor without signal input has Burn In pattern. As the following figure



Press "MENU" and ">" key at the same time to exit Burn in mode(factory mode),and soft power key off/on restart the monitor.

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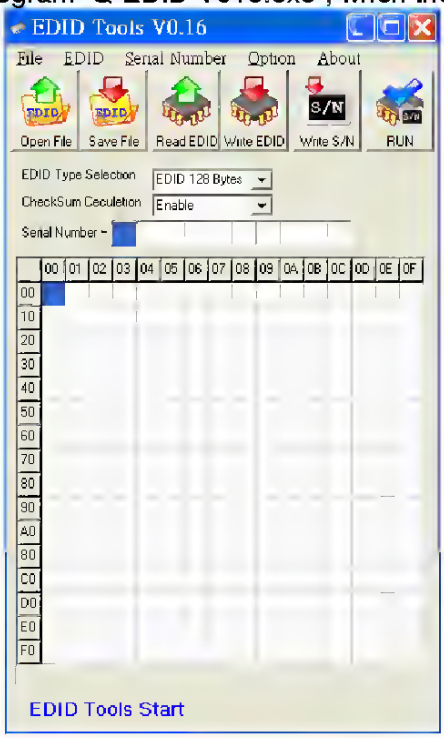
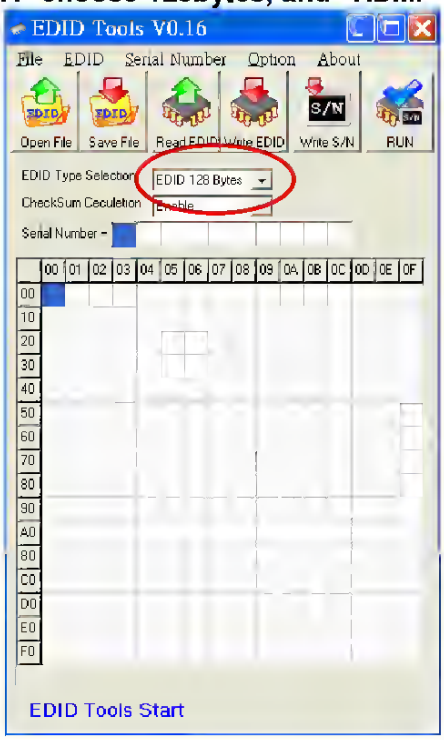
5.3 EDID Upgrade Procedure

Step 1:

Run the program "Q-EDID-V016.exe", when the UI popped up



Note: If "VGA" choose 128bytes, and "HDMI" choose 256bytes



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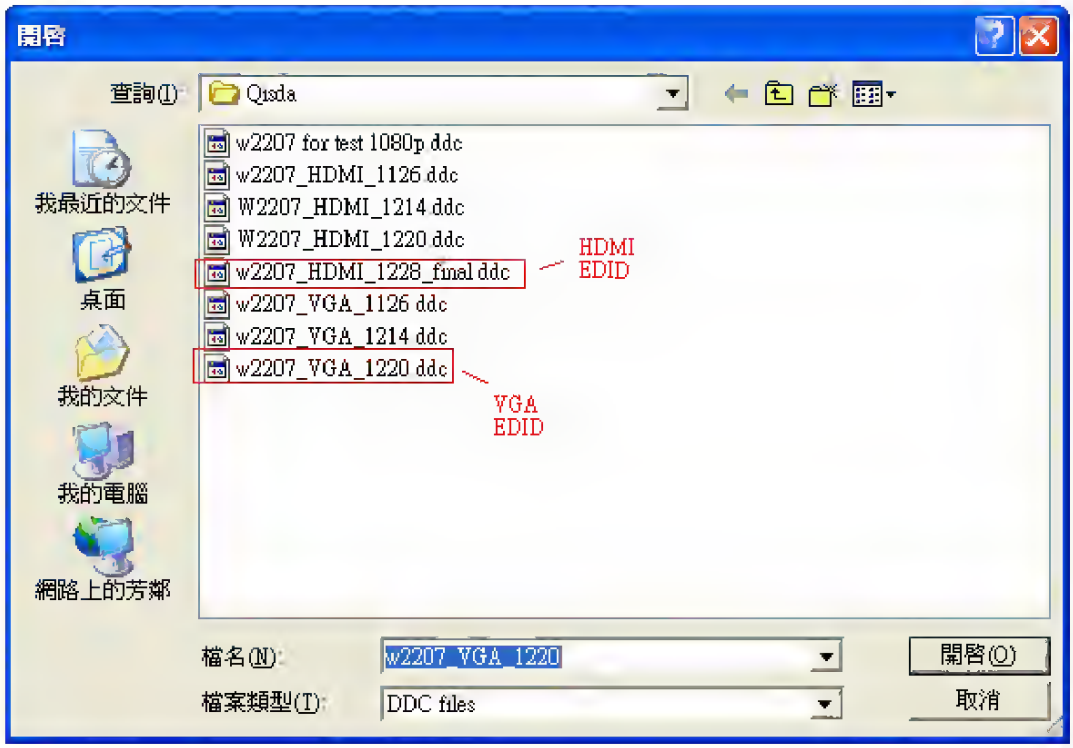
Step 2:

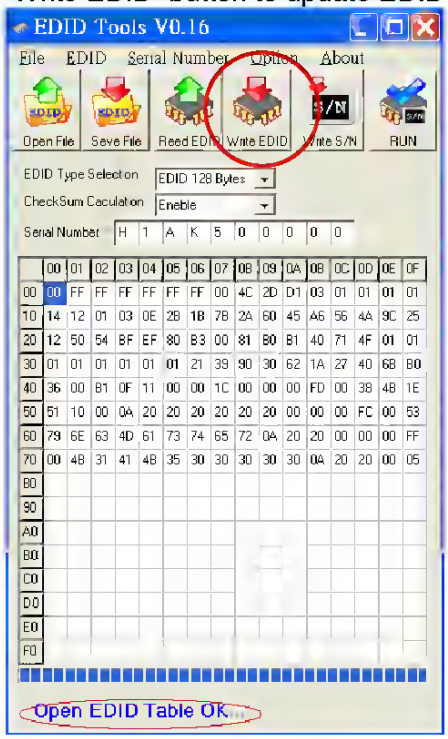
Click “Open File” and select “VGA” or “HDMI” EDID file



Step 3:

If load file is successful, it shows “Open EDID Table OK..”.

And then, Click “Write EDID” button to update EDID



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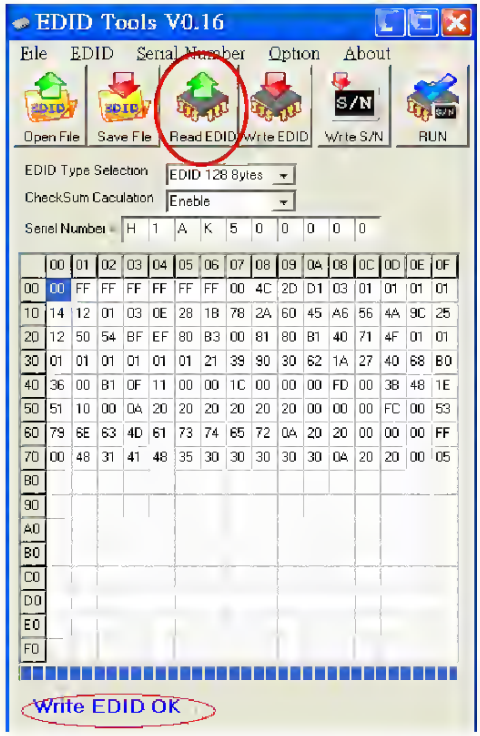
Step 4:

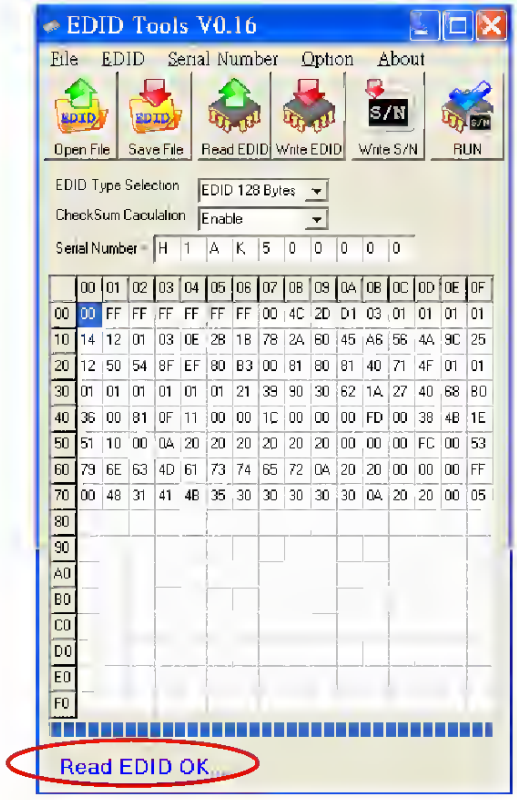
If write EDID is successful, it shows "Write EDID OK ..."

And then, click "Read EDID" button to check if successful or not.



Step 5:

If read EDID is successful, it shows" Read EDID OK ..."



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5.4 OSD Operation Guide

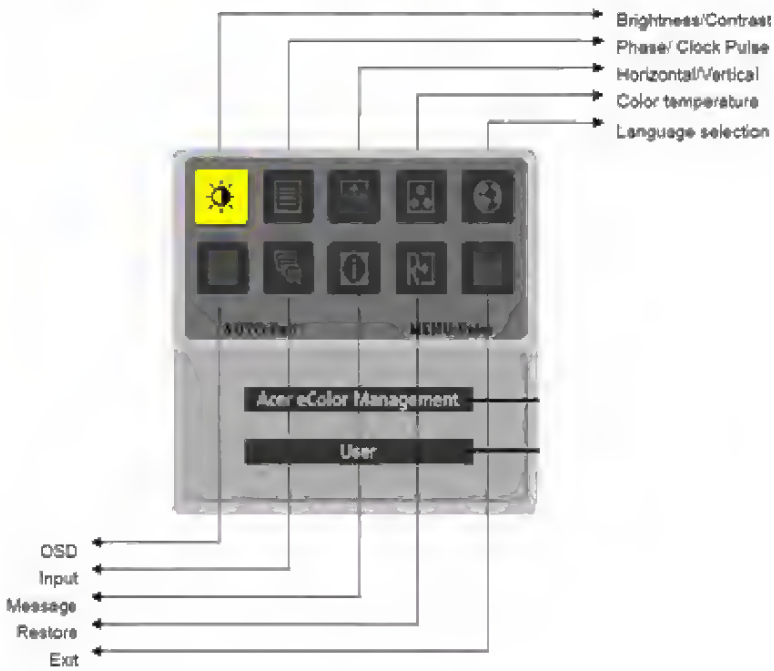
OSD Function Requirements

A. Acer eColor Management

If selected to "Acer eColor Management " item, will appear the Acer eColor" OSD

B. USER

If selected to "USER" item, will appear the Standard OSD



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A. Acer eColor Management

Main Menu icon	Sub Menu icon	Sub Menu item	Description
	N/A	User mode	User defined. Settings can be fine-tuned to suit any situation
	N/A	Text mode	Optimal balance of brightness and contrast prevent eyestrain. The most comfortable way to read onscreen text
	N/A	Standard mode	Default Setting. Reflects native display capability
	N/A	Grahpic mode	Enhances colors and emphasize fine detail
	N/A	Movie mode	Displays scenes in clearest detail. Pictures and photographs appear in vibrant colors with sharp detail)

B. USER

Main Menu icon	Sub Menu icon	Sub Menu item	Description
		Contrast	Adjust the contrast between the foreground and background of the screen image
		Brightness	Adjust the background brightness of the screen image
		ACM	ACM (Adaptive Contrast Management)A CM ON/OFF Switch, default "OFF"
		Focus	Adjust picture Focus (available in analog mode only)
		Clock	Adjust picture Clock (available in analog mode only)

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Main Menu Icon	Sub Menu Icon	Sub Menu Item	Description
		H. Position	Adjust the horizontal position. (available in Analog mode only)
		V. Position	Adjust the vertical position. (available in Analog mode only)
	N/A	Warm	Set the color temperature to warm white.
	N/A	Cool	Set the color temperature to cool white.
		User /Red	Adjusts Red/Green/Blue intensity.
		User /Green	
		User /Blue	
	N/A	English	Multi-language selection.
	N/A	繁體中文	
	N/A	Deutsch	
	N/A	Francais	
	N/A	Espanol	
	N/A	Italiano	
	N/A	简体中文	
	N/A	日本語	
	N/A	Suomi	EMEA version OSD only
	N/A	Nederlands	
	N/A	Pyccknn	

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Main Menu Icon	Sub Menu Icon	Sub Menu Item	Description
		H. Position	Adjust the horizontal position of the OSD.
		V. Position	Adjust the vertical position of the OSD.
		OSD Timeout	Adjust the OSD timeout.
	N/A	Analog	Select input signal from analog (D-Sub)
	N/A	Digital (only Dual-InputModel)	Select input signal from digital(DVI) (only Dual-Input Model)
	N/A	DDC/CI	Turn ON/OFF DDC/CI support
	N/A	Information	Show the resolution, H/V frequency andinput port of current input timing.
	N/A	Reset	Clear each old status of Auto-configurationand set the color temperature to Cool.
	N/A	Exit	Save user adjustment and OSD disappear.

Remark: Acer logo must be appeared while “power on” or “suspend”

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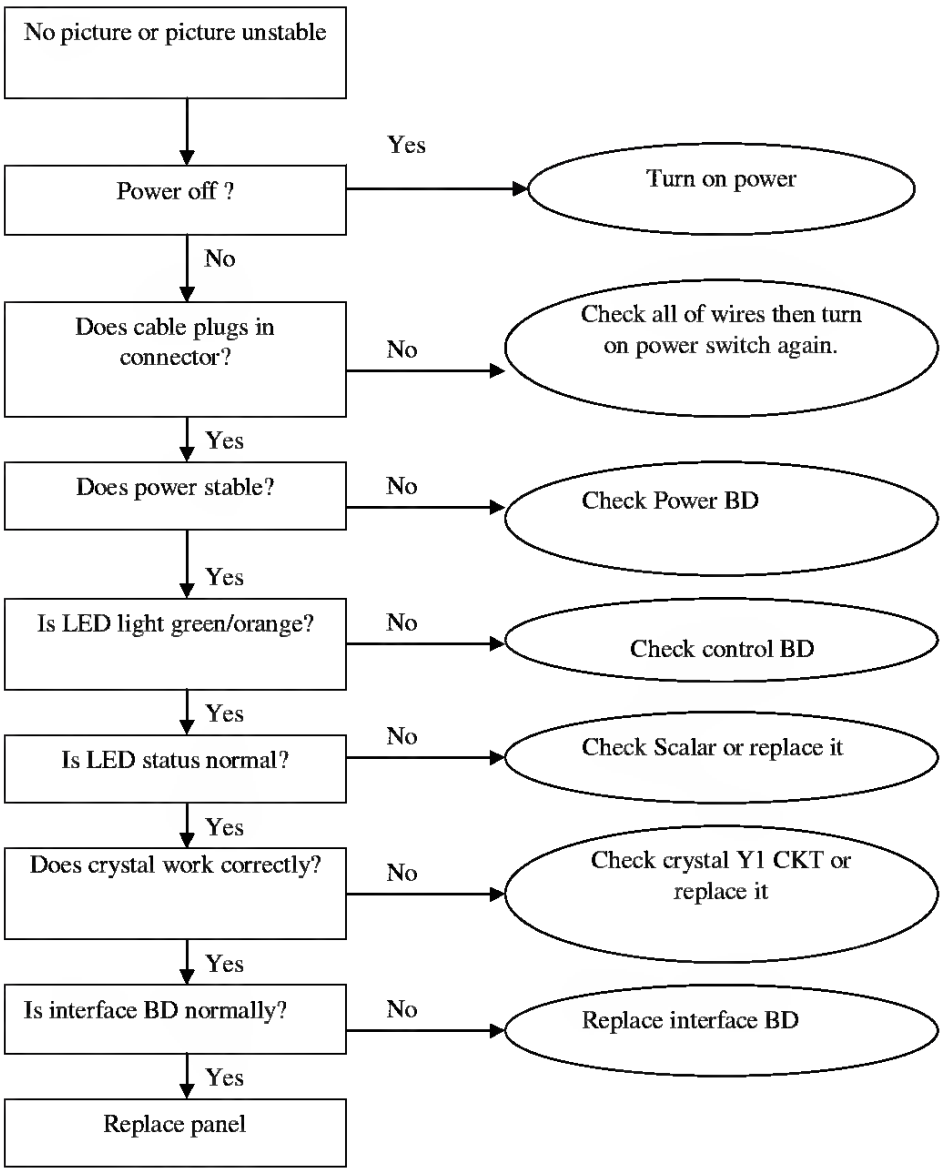
6. Level 2 Circuit Board and Standard Parts Replacement

6.1. Trouble Shooting Guide

1. No Display or display is unstable:

1.1. Interface Board:



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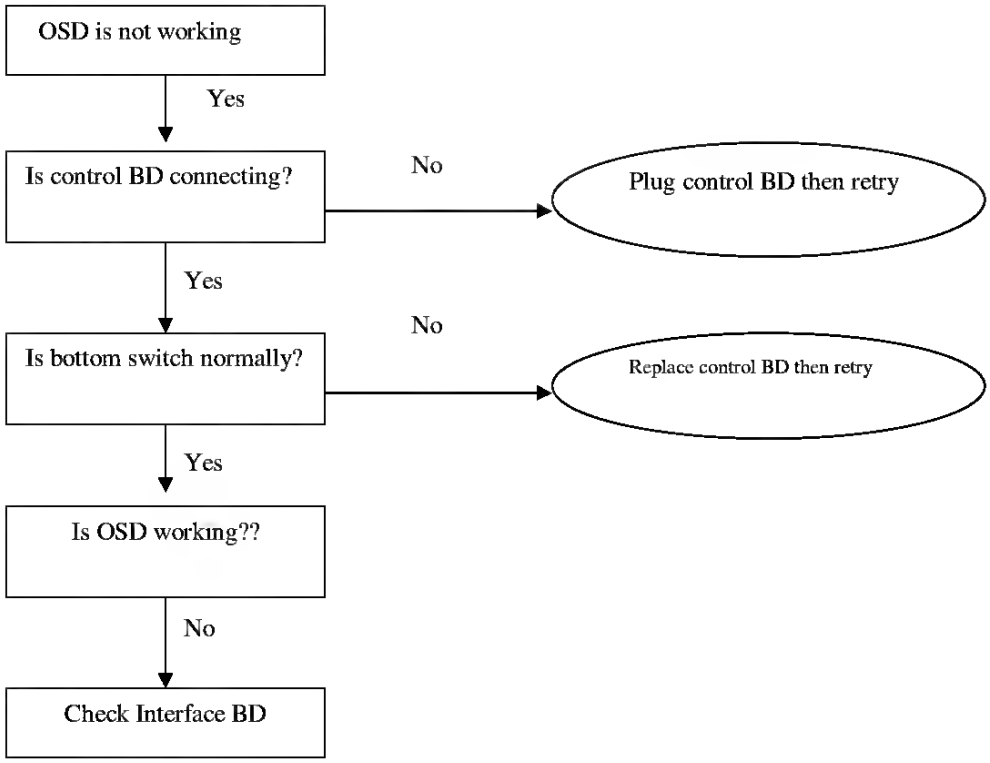
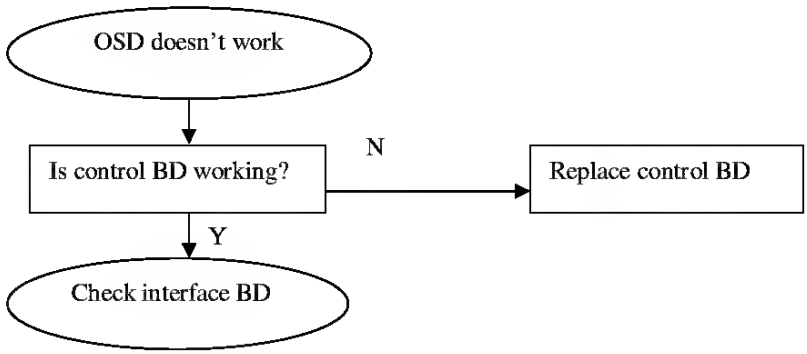
2. BUTTON Function:

2.1 Control Board



3. OSD function:



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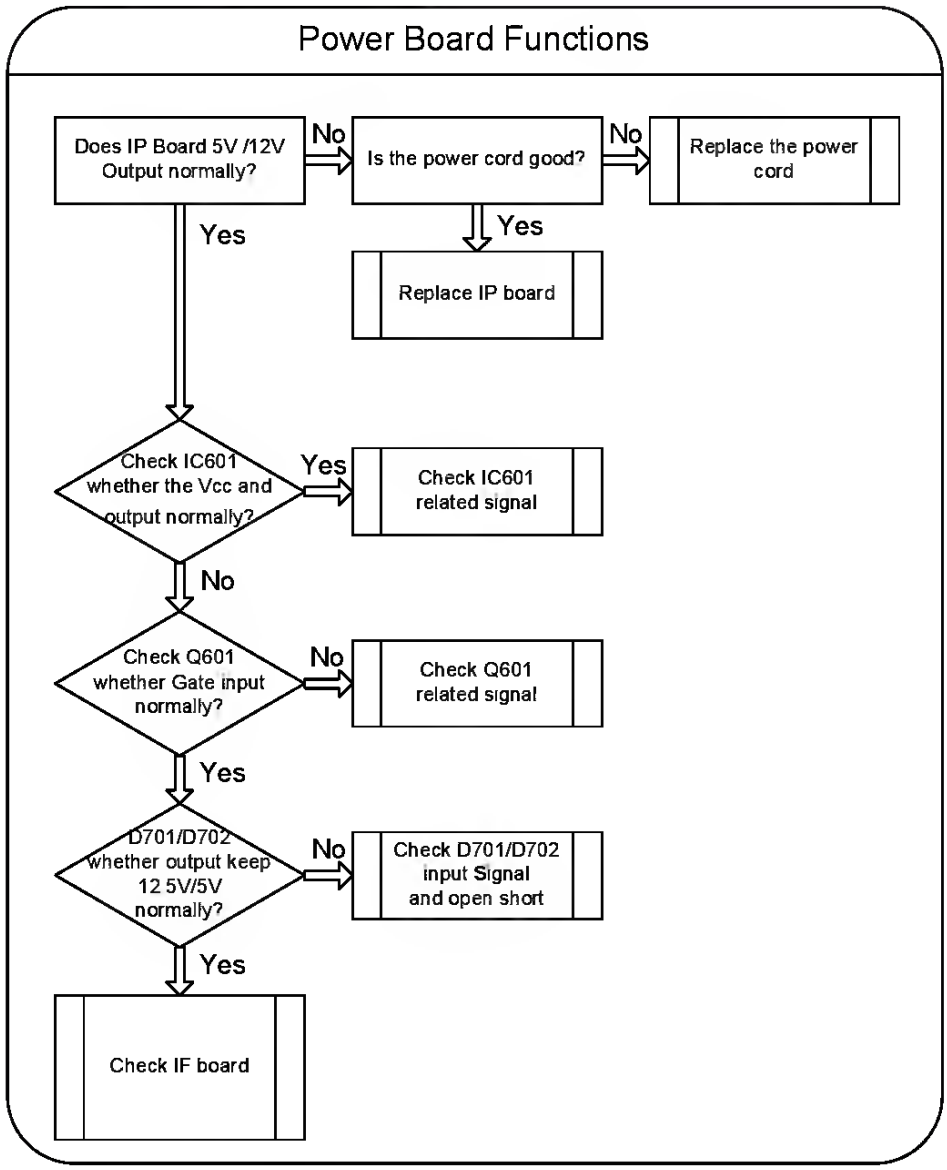
4. Power no work troubleshooting



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6.2 Circuit Operation Theory

I. Introduction:

X193HQ is a 18.5 inch and 24bits color TFT LCD monitor, which can support the resolution up to 1366x768. It has VGA input and compliant with VESA specification to offer a smart power management. The monitor has DDC/CI function to make the monitor communicate with PC by Acer ADM DDC/CI software, and also it has ACM function to let the monitor contrast ratio up to 10000:1. It also offers OSD Menu for users to control the adjustable items and get some information about this monitor.

II. Block diagram

X193HQ consists of a main body and a stand (base). The main body contains a AUO TFT LCD module with 2 CCFL lamps, a power board (includes AC/DC、 DC/DC、 inverter and panel power source), a control board and an interface board. The block diagram is shown as below.

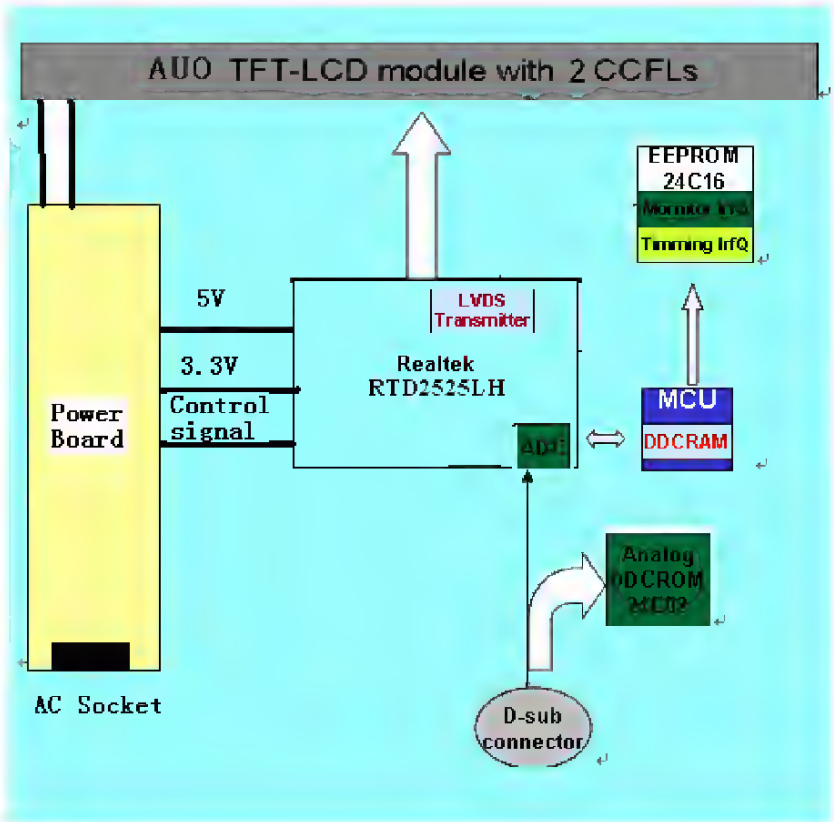

Fig. Block diagram for X193HQ LCD monitor

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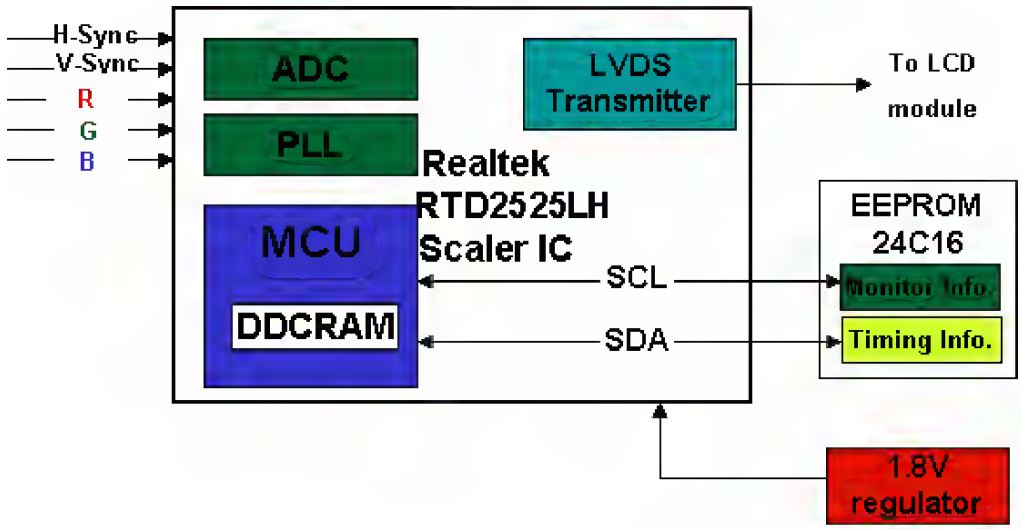
III. Circuit operation theory:

A.) THE MAIN BODY:

A-1.) Interface board block diagram:



(a) Circuit operations:

The scaling IC has OSD and auto detecting input timing functions. OSD offers adjustable functions to the end-users. Auto detecting timing function can detect change modes. It outputs the digital R-G-B data, pixel clock and control signal to TCON of the LCD module. A MCU, build in scaling IC (Realtek2525LH), is responsible for the system processing. There are two external storing units, one is 24C16 to store the OSD function data and user preset timings.

(b) IC introduction:

1.) Realtek2525LH SCALER IC:

Realtek2545L series products are all-in-one LCD monitor controller with analog (RGB), DVI and video inputs, supporting UXGA/ WXSGA+WXGA+/SXGA(optional),and integrate Realtek high performance ADC,scaling engine,LVDS Tx,and so on.Moreover,all products are pin compatible in QFN 48-pin package to save cost and make the design easier. The RTD also includes an ITU656 video format input port with color space converter that makes it an attractive solution for low cost MFM and TV applications. The output section contains a 24-bit TTL output interface and a channel LVDS transmitter for direct interfacing of commercially available LVDS LCD panel modules. In addition, RTD2525LH embedded 16.5KSRAM dynamically stores OSD command and fonts, compatible advanced color control features.

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2.) EEPROM:

We use 24C16 EEPROM to store monitor user data and user preset timings. There are 16 user timing modes are automatically saved in it. Each timing mode is allocated with 22 bytes of memory space for information such as Sync frequencies, polarities… etc. PC can access the EEPROM data indirectly through the SDA and SCL channels of DVI and D-sub (IIC communication). The digital and analog DDC data are stored in two 24C02s EEPROM.

A-2.) Power board diagram:

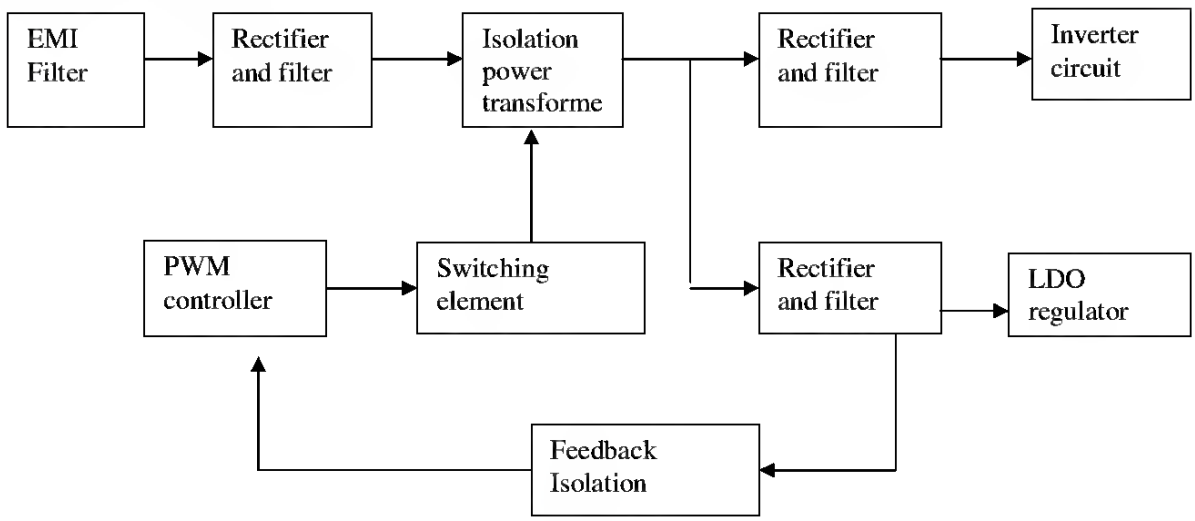

Fig.1

#1 EMI Filter

This circuit (fig. 2) is designed to inhibit electrical and magnetic interference for meeting FCC, VDE, VCCI standard requirements.

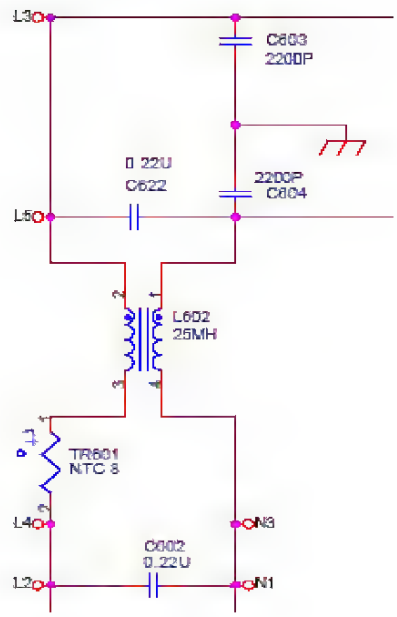

Fig. 2

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6.3 Spare Parts List

Ship To Area	Part Number	Description
EMEA	ET.LEK0D.002	18.5W LCD MNT DUAL EU

LEVEL	CATEGORY	DESCRIPTION	OEM PART NO.
1	LCD	LCDM18.5W M185XW01-V0 Z AUO	5F.LUHV0.001
1	BOARD	PCBA CTRL BD MI P22XW	5E.0GT03.001
1	BOARD	PCBA IFBD DUAL AU MI X193HQ	5E.0NA01.004
1	BOARD	PCBA SPS BD MI X193HQ	5E.0NA02.001
1	CABLE	CORD H05VV-F 10A250V EUR 1.8M	2G.00921.001
1	CABLE	CABLE DVI-D/DVI-D 1.8M IS_8 VW	5K.05406.501
1	CABLE	WIRE 7/9P CTRL BD X193HQ	5K.0NA01.001
1	CABLE	WIRE LVDS 30/20P 1571 G900HD	5K.0NJ01.001
1	CABLE	WIRE PWR 10/11P 1571#28 G900H	5K.0NJ02.001
1	CABLE	CABLE SIGNAL/C H+V OD_5.5 1.8M	5K.L2H06.511
1	CASE/COVER/BRACKET ASSEMBLY	ASSY BASE W/P DUAL X193W	6K.0K406.001
1	CASE/COVER/BRACKET ASSEMBLY	ASSY BZL DB19A X193HQ	6K.0NA01.001
1	CASE/COVER/BRACKET ASSEMBLY	ASSY RC DUAL X193HQ	6K.0NA03.001
1	CASE/COVER/BRACKET ASSEMBLY	ASSY CLMN X193HQ	6K.0NA10.001

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Appendix 1 – Screw List / Torque

(A)STANDARD SCREW TORQUE SPEC.

ITEM	P/N	DESCRIPTION	Color	Mounting Material	TORQUE (KG-CM)	HOLE SIZE (MM)	Screw Head
1	8F.205B4.019	SCRW MACH HEX #4-40*0.3" N	Ni	Metal; D-SUB;DVI Connector	5.0±0.6	#4-40	X
2	8F.00518.100	SCRW TAP W/FL M3*10L(S3.8) ZN	NI	Metal	None tread：8～10 Have tread:6～8 Aluminum:4~5	Ø2.68±0.03	#2
3	8F.1A556.8R0	SCRW MACH PH M4*8L NI NYL	NI	Metal	11.0±1.0	M4*0.7	#2
4	8F.5A356.8R0	SCRW MACH FH M4*8L B-ZN NYL	B-Zn	Metal	9.0±1.0	M4*0.7	#2
5	8F.5A422.2R4	SCRW MACH FLAT-P M2*2.4L ZN	Zn	Plastic	1.0±0.1	Ø1.7±0.05	#1
6	8F.00273.6R0	SCRW TAP PH F/10WSH M3*6L C-ZN	C-Zn	Metal	None tread：8～10 Have tread: 6～8 Aluminum: 4~5	Ø2.68±0.03	#2
7	8F.VZ524.6R0	SCRW TAP FLAT+EXT M3*6L C-ZN	C-Zn	Metal	None tread：8～10 Have tread:6～8 Aluminum:4~5	Ø2.68±0.03	#2
8	8F.5A356.120	SCRW MACH FH M4*12L B-ZN NYL	B-Zn	Metal	11.0±1.0	M4*0.7	#2
9	8F.5A456.8R0	SCRW MACH FLAT M4*8L C-ZN NYLO	C-Zn	Metal	11.0±1.0	M4*0.7	#2
10	8F.WA314.8R0	SCRW TAP CAP M3*1.34P*8L B-ZN	B-Zn	Plastic	5.0±1.0	Ø2.35±0.05	#2

(B) SPECIAL SCREW TORQUE SPEC.

ITEM	P/N	DESCRIPTION	MOUNTING MATERIAL	TORQUE (KG-CM)	HOLE SIZE (MM)	Screw Head

*SCREW Q'TYPE AND POSITION REFERRED TO C328.

*NOTES:

1. (A) STANDARD SCREW TORQUE SPEC.
2. (B) SPECIAL SCREW TORQUE SPEC.
3. T: TAPPING SCREW.
4. M: MACHING SCREW.

D-SUB Connector SCREW TORQUE SPEC.

SCREW TORQUE: 1.2±0.3 (KG-CM)

DVI Connector SCREW TORQUE SPEC.

SCREW TORQUE : 1.2±0.3(KG-CM)

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Appendix 2 – Physical Dimension Front View and Side view

Fig. 1 Physical Dimension Front View and Side view

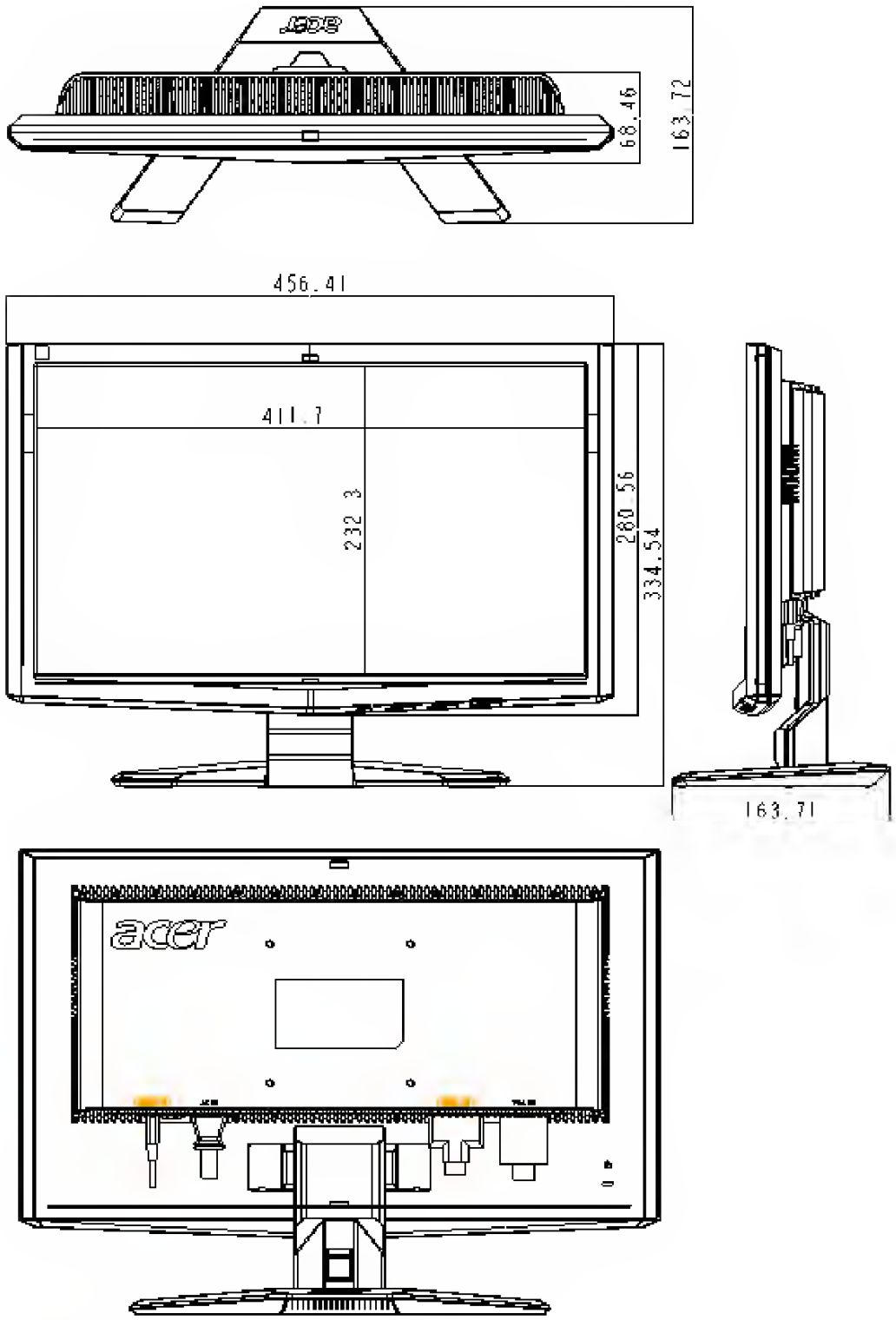

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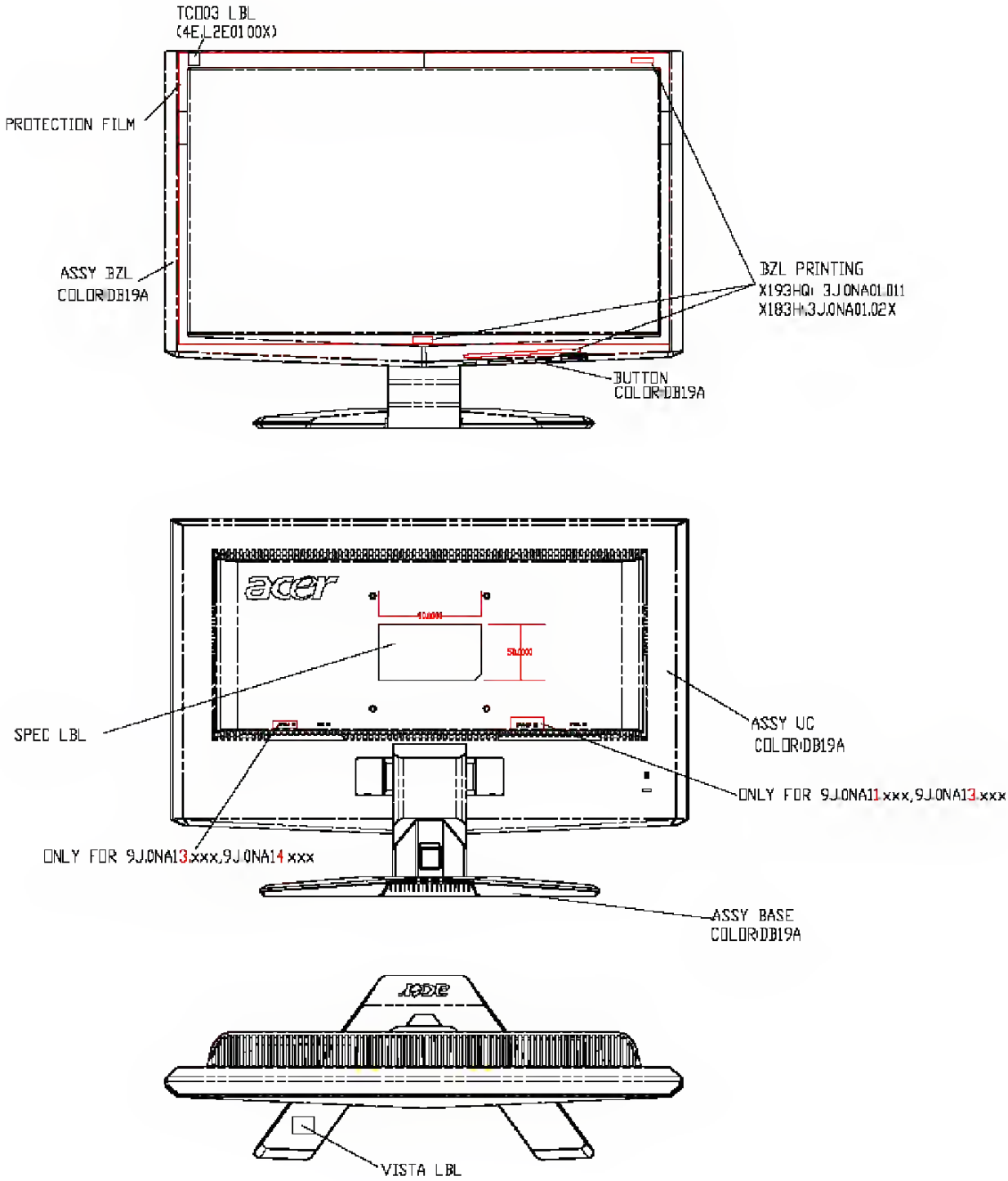
Fig. 2 Appearance Description



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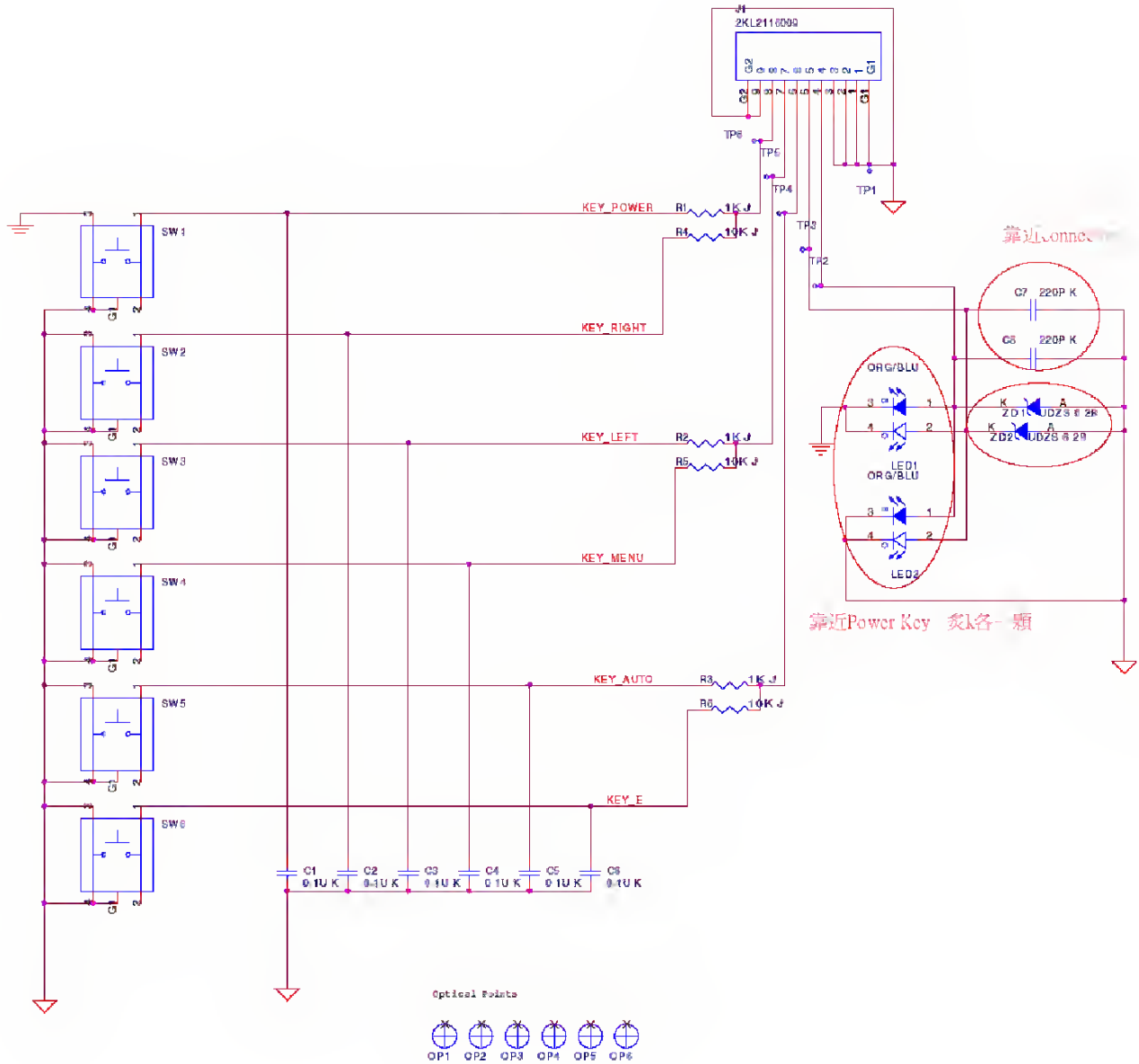
Appendix 3 – Control Board



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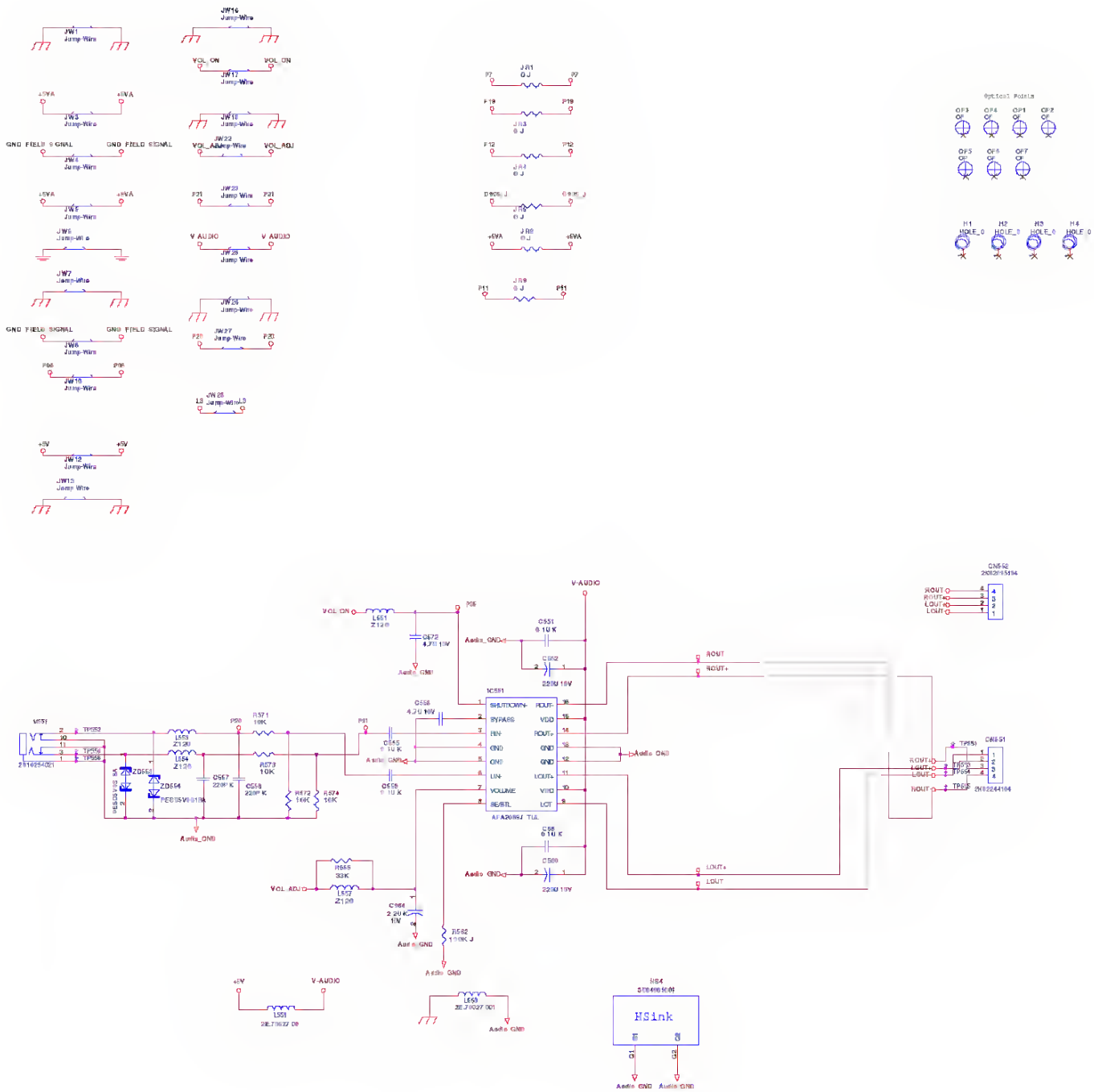
Appendix 4 –Power Board



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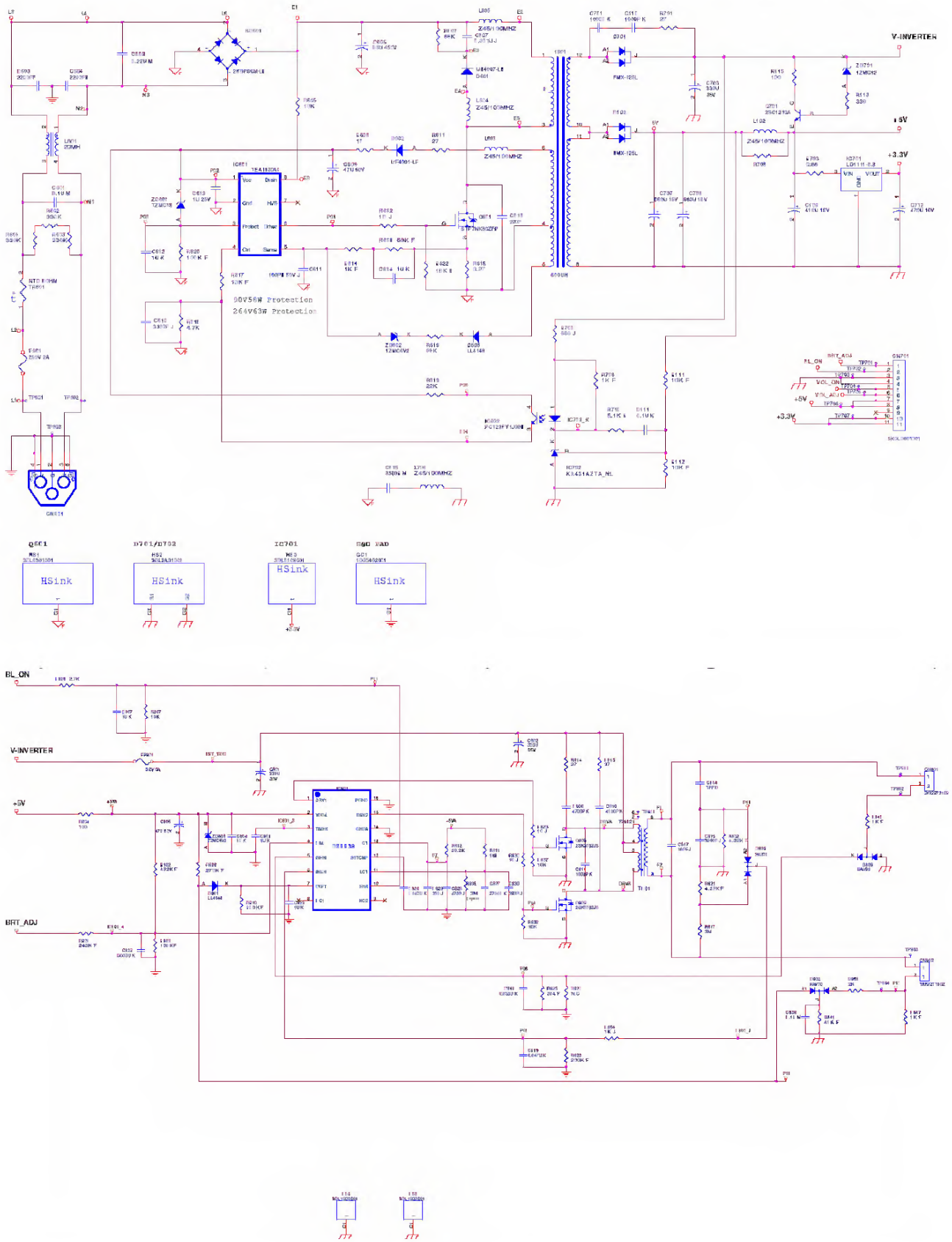

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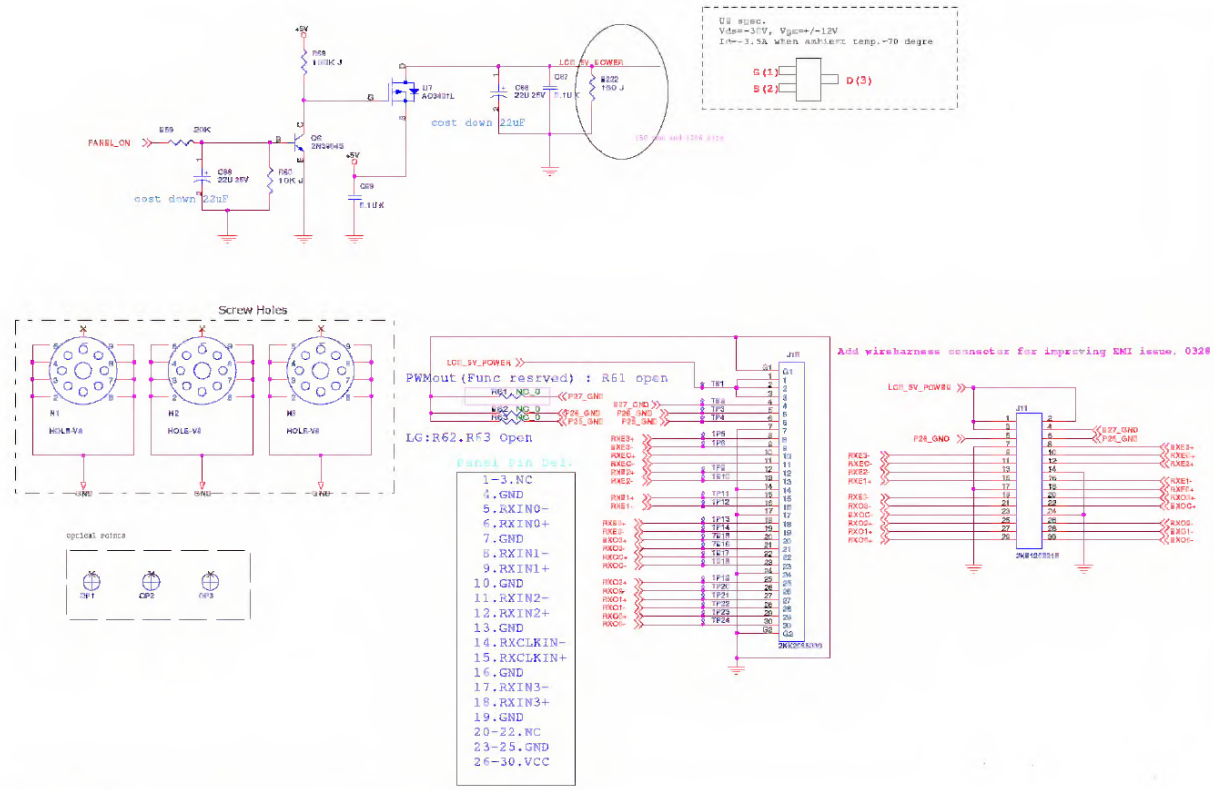
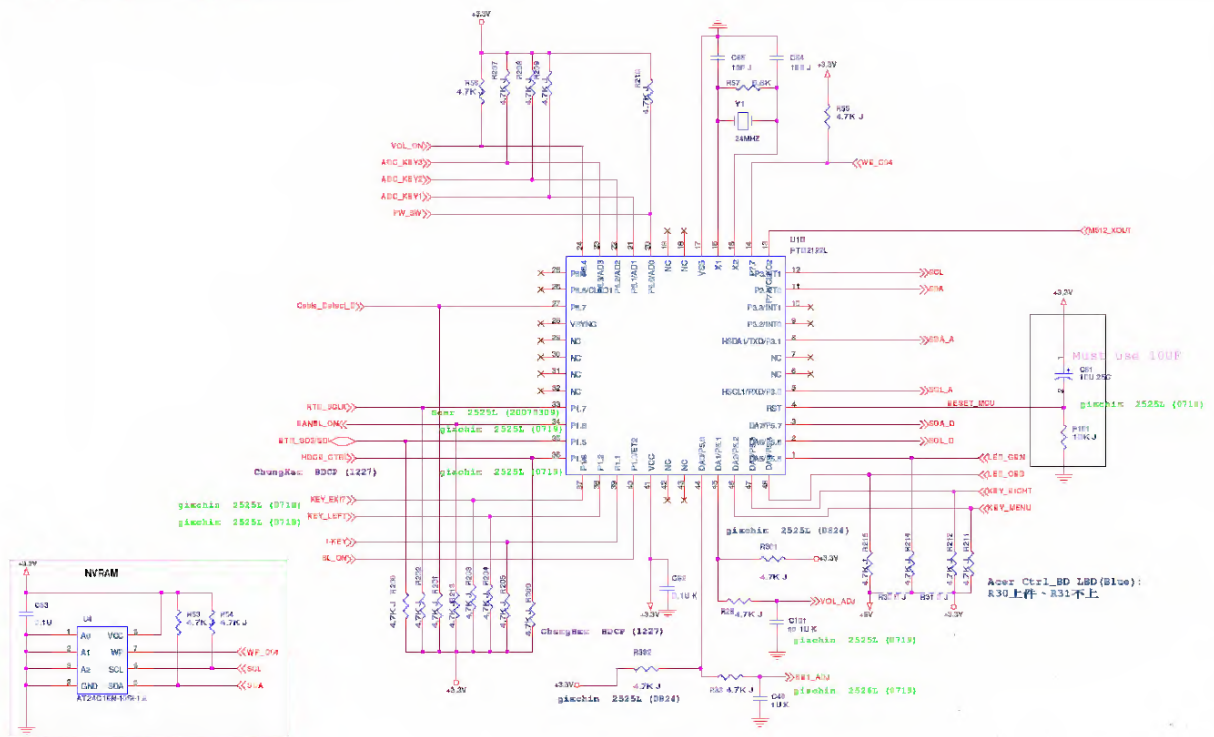
Appendix 5 –Interface Board



change RN1-RN5 to R200-R215 0724



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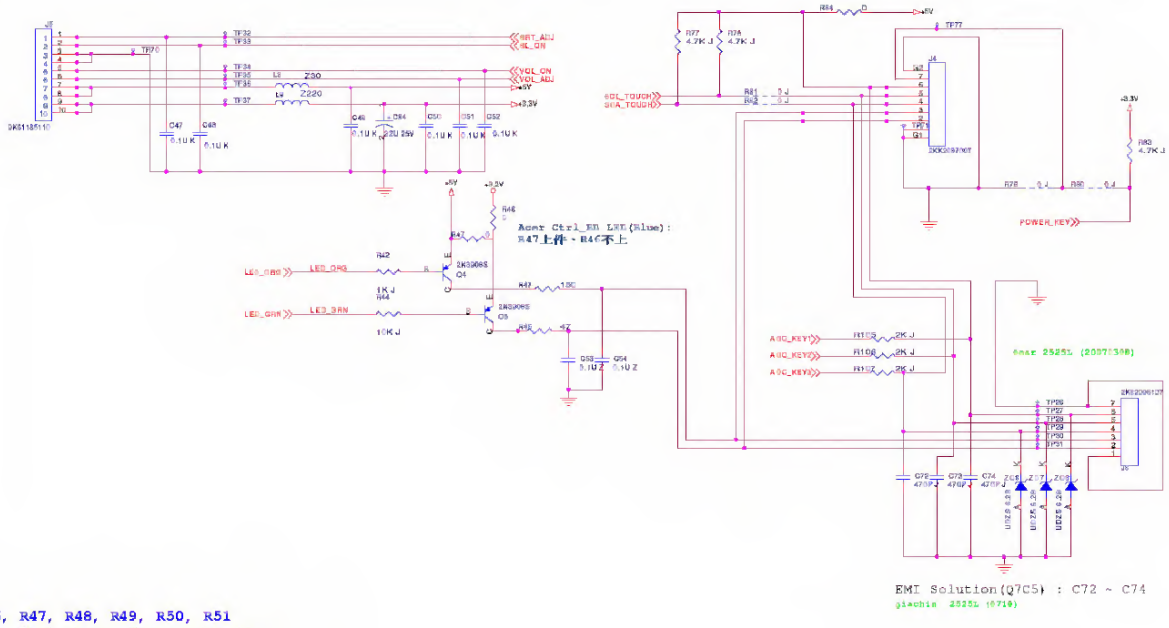
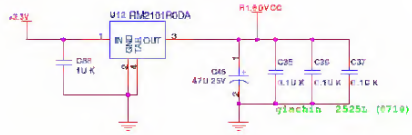
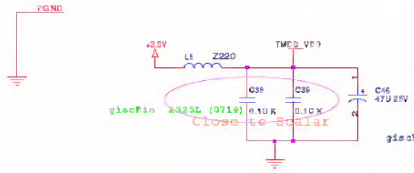
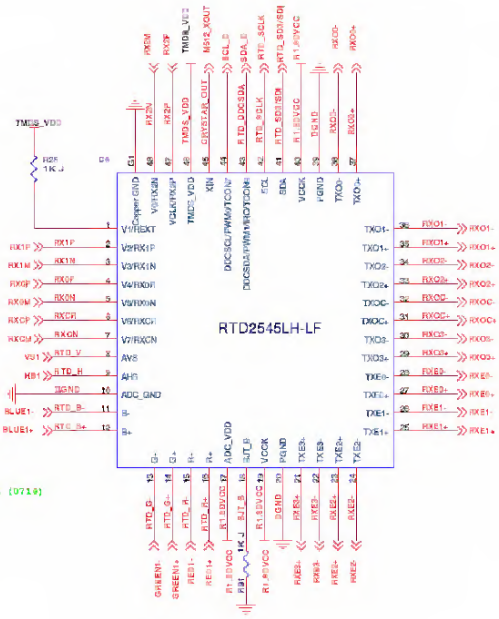


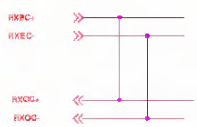
R46, R47, R48, R49, R50, R51
ZD9, ZD10, ZD11, ZD12, ZD13, ZD14
C55,C56,C57,C58,C59,C60
J4
Open for ADC key



BJT 3906 change to BJT2907
(Ic=200mA ==> 600mA)-giachin 2525L (0720)







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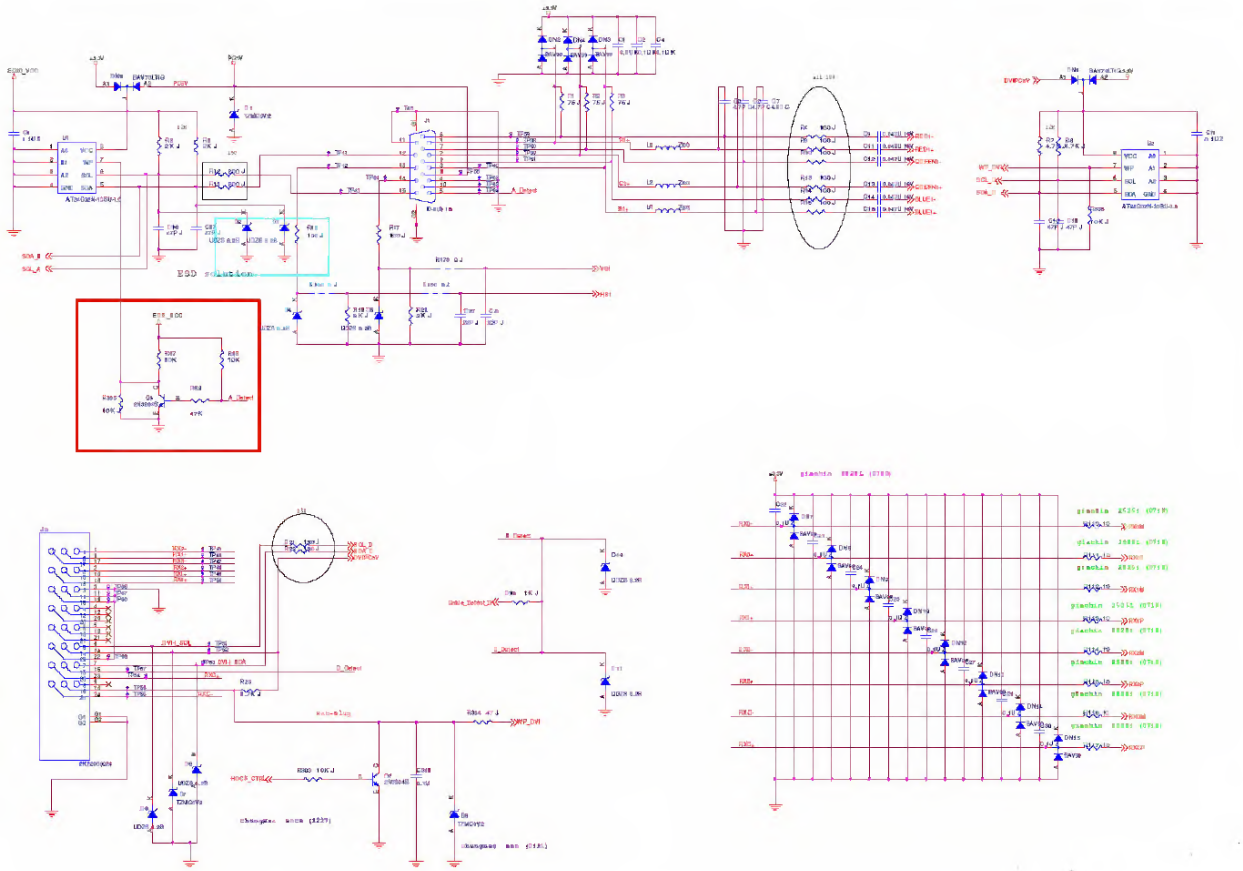

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